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# It only takes once: influence of sexual risk status, social comparison, and a Public Service Announcement on absent-exempt cognitions

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It only takes once: influence of sexual risk status,  
social comparison, and a Public Service Announcement on absent-exempt cognitions

by

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## INTRODUCTION

Sexually transmitted diseases (STDs) are among the most common infectious diseases in America today. Although there have been many studies of the social psychology of HIV infection and AIDS, relatively few studies have examined the more prevalent STDs that occur primarily in young people under the age of 25, such as genital herpes (Center for Disease Control, 2007). In the last few decades, the number of genital herpes cases has risen dramatically, making it one of the most common STDs in the United States –it affects an estimated 45 million Americans (Center for Disease Control, 2007). Despite these statistics, most people who are infected do not know it because their symptoms are too mild to notice or are mistaken for another condition (Center for Disease Control, 2007). In addition, young adults consistently overestimate others' risk and rate their own risk significantly lower than their actual risk for being infected with herpes (Rothman, Klein, & Weinstein, 1996).

These factors, along with the fact that people are often uncomfortable discussing STDs, contribute to the current limited knowledge regarding the impact that comparison–based information on STDs may have on health behaviors and cognitions. Social comparison theory suggests that individuals evaluate their personal attributes and their situation by comparing themselves with others (Festinger, 1954). Most social comparison research has suggested that when individuals are faced with thinking about their risk of illness or contracting a disease, they *choose* to compare themselves with similar others on attributes related to the risk. However, this process of gaining information through social comparison with similar others (e.g., comparison with others in terms of frequency of binge drinking and its negative consequences) is often not available for STDs. One result of this is that young adults have less opportunity to learn

about the potential negative consequences of sex through comparison with others, and thus, do not have this information when deciding if they may also be at risk.

Although individuals have some control over which comparison opportunities they pay attention to and how they construct comparison opportunities, it is also the case that some comparisons are forced upon them, e.g., grade distributions that accompany one's grade on an examination. In addition, the process of social comparison often occurs spontaneously and unintentionally; simply seeing or hearing a person is enough to exert an automatic effect on subsequent cognitions and behaviors (Gilbert, Giesler, & Morris, 1995; Gordijn & Stapel, 2006; Stapel & Blanton, 2004). Therefore, the type of comparison targets an individual may encounter in dealing with STDs can lead to a form of unintended social comparison, such as hearing a peer discuss being diagnosed with an STD, as in the present study. When exposed to threatening information from a potential comparison target (e.g., a fellow student has been diagnosed with herpes), the process of social comparison becomes a *reaction* to that information.

Media messages or Public Service Announcements (PSAs) often include a salient form of social comparison: other young adults suffering from a disease or other negative consequences (e.g., STDs or HIV; Rothman, Kelly, Weinstein, & O'Leary, 1999). Hearing peers talk about their experiences will naturally prompt the comparison process, which undoubtedly will have an impact on the audience, especially if they are prone to engaging in social comparisons. Unfortunately, the psychological effects of health messages that feature these models have rarely been evaluated. Additionally, educational programs or PSAs often warn adolescents not to have unprotected sex because, "it only takes once" to get pregnant or contract an STD (e.g., Advocates for

Youth, 2006; Carr, 2006). A line of research I have conducted suggests these prevention messages may end up reinforcing a sense of comparative invulnerability, rather than undermining it. This may be especially likely for those at higher-risk, who may be reminded of the risky behaviors in which they have engaged (e.g., Stapel & Schwinghammer, 2004). After hearing a health message emphasizing potential negative consequences of risk behaviors, at-risk individuals are likely to engage in defensive processing. This defensiveness can cause resistance to change due to minimization of the link between their behavior and the potential negative consequences (e.g., Klein, 1996; Gerrard, Gibbons, Benthin, & Hessling, 1996; Gibbons, Egelston, & Benthin, 1997). In addition, those who engage in frequent risky behavior--especially if they have not suffered any negative consequences from that behavior--may maintain a form of optimistic bias, in that they come to believe that they are not vulnerable and are at lower risk compared to others (Weinstein, 1982, 1987).

To date, there has been very little research examining how either social comparison with a low-risk infected target or a PSA that tells adolescents “it only takes one time” to get an STD affects individuals’ health-risk cognitions and time spent processing health-related information. Comparison-based health messages are common approaches taken in the media, but the potential impact of prompting the comparison process in relation to health behaviors and risk perceptions has rarely been examined. It is important for researchers to understand the impact differing forms of health messages have on low-risk and high-risk participants and the role social comparison processes play in these messages. The current study had participants who were at high or low risk of contracting STDs review their sexual history and then either:

a) hear from an individual who had contracted an STD despite the fact that he or she

had engaged in risky sexual behavior only a few times, b) hear a PSA on STDs presented by a health center employee, or c) not hear any information. The study also examined the role of social comparison tendencies as a potential moderator of the effect of the manipulation on health-risk cognitions.

## MODELS OF HEALTH DECISION-MAKING

### Expectancy-Value Theories

The theory of reasoned action (Fishbein & Ajzen, 1975) and the theory of planned behavior (Ajzen, 1985, 1991) are two of the most well-known expectancy-value theories of the relation between attitudes and behaviors. These theories view social behavior from a decision-making perspective. They are based on an assumption that behavior is the result of a decision-making process that involves consideration of the behavioral options as well as the possible outcomes or consequences associated with the options. These theories suggest that perceptions about a behavior and its anticipated outcomes (i.e., attitudes and perceived social pressure to engage or not to engage in a behavior) combine to influence intentions. Thus, the concept of intention to perform a behavior presupposes that the behavior is a conscious choice; this process is thought to be a reasoned one that involves some level of premeditation and planning. This approach has been labeled the “consequentialist” approach (Loewenstein, Weber, Hsee, & Welch, 2001).

Cross-sectional research based on the theory of reasoned action has demonstrated that past sexual intercourse among teenagers is associated with positive attitudes and norms related to sexual behavior, and in turn, intentions to have sex in the future (Gilmore et al., 2002). Longitudinal research has also supported the relation between intentions to use condoms and condom use six months later among adults (Morrison, Gillmore, & Baker, 1995). The theory of planned behavior was developed to increase the theory of reasoned action’s predictive ability by adding the concept of perceived behavioral control, the belief that one can actually perform the behavior (Ajzen, 1991). In fact, the addition of perceived control has improved the models’ ability

to predict various health-related behaviors, including condom use (e.g., Albarracin, Fishbein, Johnson, & Muellerleile, 2001; Sheeran & Taylor, 1999).

Past research has demonstrated that these reasoned models have had some success in predicting intentions and behaviors related to sexual behaviors. They have been criticized, however, for being less applicable to more complex behaviors, particularly social behaviors (Eagly & Chaiken, 1993). In addition, their success in predicting risky-health behaviors in young adults has been mixed (Gibbons, Gerrard, Blanton, & Russell, 1998; Larabie, 2005; Reyna & Farley, 2006). Overall, these expectancy-value theories are more effective at predicting more rational or reasoned behaviors, and are less effective at explaining behaviors that are socially undesirable (Beck & Ajzen, 1991), or that have a significant affective component (Eiser, Eiser, & Pauwels, 1993). Both of these are characteristics of adolescent health-risk behaviors, such as unprotected sex. In fact, when asked if they intend to engage in risk behaviors, such as binge drinking or sex without protection, the vast majority of adolescents will say no. Statistics indicate, however, that many of them will engage in these behaviors, and some number will do so repeatedly (e.g., Johnston, O'Malley, & Bachman, 2000).

### **Prototype-Willingness Model**

Adolescents' decisions to engage in risky-health behaviors often do not follow the planning sequence outlined by expectancy-value theories. Thus, intentions to engage in a specific risk behavior may not always be the best predictor of whether adolescents and young adults actually engage in that behavior (Gibbons & Gerrard, 1997; Jacobs & Klaczynski, 2005; Reyna & Farley, 2006; Ravis, Sheeran, & Armitage, 2006). This recognition led Gibbons and Gerrard to develop the prototype/willingness model (see Figure 1; Gibbons & Gerrard, 1995), which modifies and expands on the theory of

reasoned action. Specifically, the model was designed to address the social nature of health-related risk behaviors in adolescents and young adults. It does so by acknowledging that risk behaviors are often *reactions* to risk-conducive situations young people encounter rather than planned behaviors or reasoned actions.

**Willingness and images.** The prototype/willingness model adds behavioral willingness and the concept of risk images (or prototypes) to the theory of reasoned action. The model states that health-risk situations for young people are usually public and social—they almost always smoke, drink, or drive recklessly with friends. As a result, they have clear (social) images of the types of peers who engage in these various risk behaviors. Moreover, because young people tend to be very image-conscious (Carroll, Durkin, Hattie, & Houghton, 1997; Lloyd & Lucas, 1998), these risk images can have a strong influence on their health-risk behavior. Finally, the model maintains that images influence behavior via a social comparison process—self vis-à-vis the image.

**Dual-processing and the prototype/willingness model.** The prototype/willingness model is a modified dual-processing model that posits two pathways to risk behavior. One path is reasoned or intentional, whereas the other is characterized by a relative lack of consideration and is more heuristic or experiential in nature. The reasoned path reflects the fact that sometimes young adults do engage in risky behaviors because they have made a conscious decision ahead of time to do so. The social reaction path acknowledges that adolescent risk behavior is often a reflection of willingness to engage in a risky activity when an opportunity presents itself. Like other dual-processing models, the prototype/willingness model maintains that people are able

to and do engage in both analytic and heuristic processing (e.g., Boyer, 2006; Brainerd & Reyna, 1992; Stanovich, 2004).

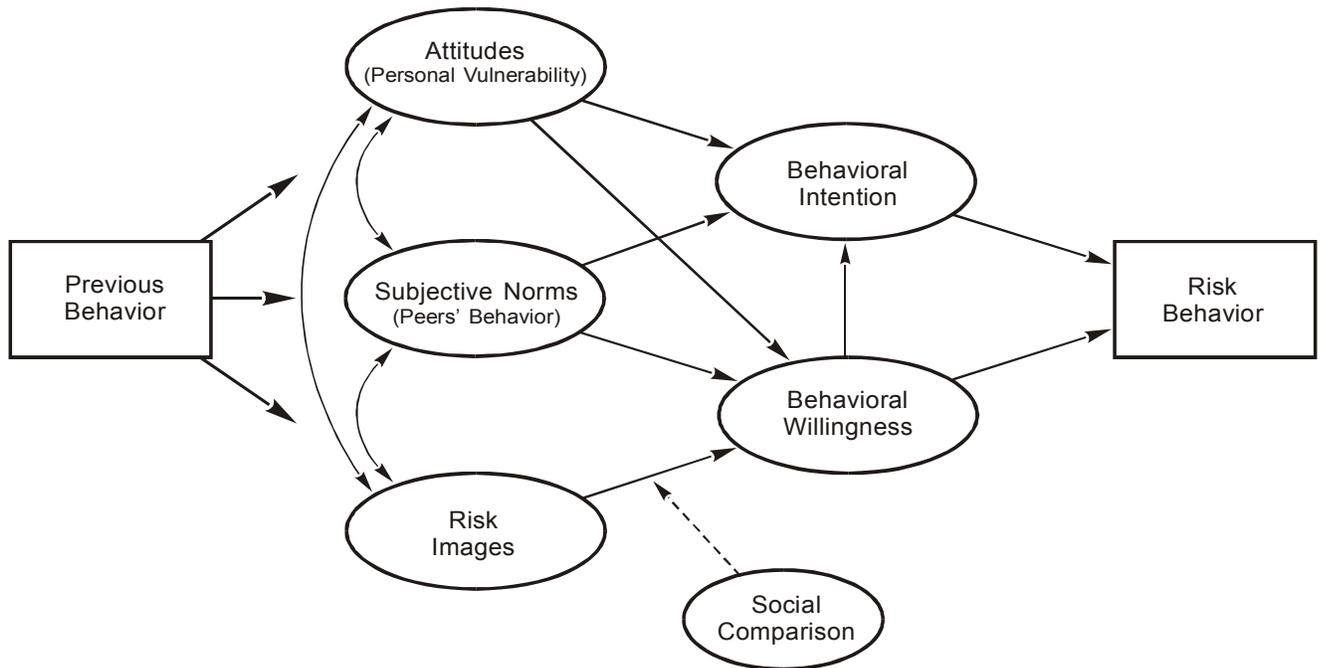


Figure 1. The Prototype/Willingness Model (Gibbons & Gerrard, 1995).

The prototype/willingness model also suggests that because willingness is not a pre-determined plan of action and involves less reasoned, more heuristic processing, it is more likely to be altered by social factors (or social influence) than are intentions. Thus, social comparison (e.g., with a person who has an STD) is likely to have more impact on willingness to engage in risky sexual behaviors than it does on intentions (Stock, Gibbons, & Gerrard, 2007). In addition, perceived similarity to and favorability of a social comparison target who has engaged in risky sex, has a greater effect on subsequent willingness than it does on intentions, to engage in sex in the future (Thornton, Gibbons, & Gerrard, 2002). In short, because it is more heuristic-based and

more likely to be altered by social comparison, willingness, rather than intentions, is the major dependent variable in the present study (Gibbons, Gerrard, Boney McCoy, 1995; Gibbons, Gerrard, Blanton, & Russell, 1998; Stock et al., 2007).

**Additional antecedents to behavior.** Both the prototype/willingness model and the theory of reasoned action include a measure of subjective norms or perceptions of what others are doing, which are associated with higher levels of willingness and intentions (Gibbons et al., 1995). In contrast to the theory of reasoned action, however, the prototype/willingness model further acknowledges the importance of peers' social influence, thus it includes descriptive rather than injunctive norms focused on peer behavior (Deutsch & Gerard, 1955)—i.e., what the adolescent thinks his or her friends are doing rather than what they want him or her to do. Additionally, unlike the theory of reasoned action, the prototype/willingness model includes prior behavior as an antecedent. This is because a main focus of the model is to examine mediators of change in risk behaviors. The prototype/willingness model suggests that previous behavior is antecedent to perceptions of subjective norms (Gerrard et al., 1996) and willingness to engage in the risk behavior (e.g., Gibbons, Gerrard, & Lane, 2003). Most traditional models of health behavior, including the theory of reasoned action, include measures of *absolute* perceived vulnerability, which is the perception of being vulnerable to the negative consequences associated with the health behavior. The cognitive antecedent of willingness in the prototype/willingness model is *conditional* perceptions of vulnerability. This is a specific version of perceived risk and as will be discussed, is more heuristic-based.

### **Perceived Vulnerability**

**Absolute perceived vulnerability.** The majority of previous studies examining the impact of health messages have used *absolute* perceived vulnerability measures

(e.g. “What is the likelihood that you will contract an STD?”). In fact, there is evidence that people’s estimates of the likelihood that they will suffer negative consequences from risky behavior reflects some awareness or recognition of the relation between risk behavior and these consequences (see Gerrard & Luus, 1995; Weinstein, Rothman, & Nicolich, 1998). For example, a meta-analysis of the relation between absolute perceived vulnerability and precautionary behavior in 26 cross-sectional studies of HIV risk estimates concluded those who engaged in more risk behaviors tended to have higher estimates of their likelihood of contracting HIV than did those who engaged in fewer risk behaviors (Gerrard, Gibbons, & Bushman, 1996). Similarly, in one study participants were asked to estimate their risk of being infected with AIDS in the next two years and then were asked to estimate the same risk for a random, same-sex, same-age individual from the general population (van der Velde, van der Plight, & Hooykaas, 1994). The results showed that participants were sensitive to their own risk level: the high-risk group (prostitutes) rated their risk the highest and the low-risk group (monogamous heterosexuals) rated their risk the lowest. At the same time, however, all participants rated others’ risk as higher than their own. Thus, in spite of this acknowledgment of the risk associated with their own behavior, many people who engage in risky behaviors engage in heuristic processing while maintaining a form of optimistic *bias* in that they believe that they are at lower risk than are others (van der Velde et al., 1994; Weinstein & Klein, 1996). In addition, most college-aged students underestimate their risk of contracting an STD to a greater extent than they underestimate their risk of other negative events, such as being in a car accident or contracting skin cancer (Moore & Rosenthal, 1992).

**Conditional perceived vulnerability.** As mentioned, absolute measures of perceived vulnerability are generally positively associated with health risk behavior and intentions. This is consistent with the belief that, unlike willingness, behavioral intention is associated with an acknowledgement of risk (Gibbons et al., 1998). A problem with absolute perceived vulnerability measures, however, is that they confound intentions with vulnerability: individuals who are not intending to engage in the risk behavior will typically (and logically) report they are not at risk (Gibbons et al., 1998, Weinstein et al., 1998). One solution to this problem is to employ conditional measures of perceived vulnerability, i.e., ask participants what their personal risk would be *if they were to* engage in the behavior. Such measures are less susceptible to the problem of interpretation of future behavior, because they are not as closely linked to previous or anticipated behavior (Gibbons, Lane, Gerrard, Pomery, & Lautrup, 2002; van der Velde, Hooykaas, & van der Pligt, 1996). For this reason, it has been suggested that they are better indicators of true perceived risk (Rodin, 1992).

A negative relation between conditional perceived vulnerability and willingness has been demonstrated in several studies (e.g., Gibbons et al., 1998; Stock et al., 2007). The more willing participants are to engage in a risky behavior, the more likely they are to think they can “get away with it,” and not suffer any negative consequences. In addition, like willingness, conditional measures of risk are more likely to be influenced by social factors and are also more likely to involve heuristic than reasoned processing (e.g., Gibbons et al., 2004; Stock et al., 2007). The present study used conditional measures of perceived vulnerability.

**Perceived vulnerability and social comparison.** As mentioned, many individuals engage in another form of heuristic processing, called optimistic bias, in that

they view themselves as relatively invulnerable, and less vulnerable than others, to negative events (e.g., Kunda, 1990; Weinstein, 1987). These biased perceptions of risk can also occur through social comparison with “selected” or even self-constructed targets. When people are asked to think about their risk level in general, they often generate their own comparison targets and these targets are typically people that are thought to be more vulnerable to negative consequences than the individual doing the comparing (Klein & Weinstein, 1997). For example, when asked the likelihood that she will be robbed when walking home at night, a college student in a small university town in the mid-west may decide to compare her personal risk with that of students in larger cities with higher crime rates. A form of mental distortion, these comparison targets are thought to be more vulnerable to the negative consequences associated with the risk behavior and they are also seen as being different from the self (e.g., Perloff & Fetzer, 1986). Generation of a high-risk target can allow individuals to conclude that their personal vulnerability is relatively low. Low levels of perceived vulnerability, in turn, especially among people who are engaging in risky behavior, can be dangerous because studies have demonstrated a link between low risk perceptions and low levels of precautionary behavior (e.g., Kreuter & Strecher, 1995).

A willingness to engage in risky behavior may be a reflection of the biased perception of diminished personal risk that comes from comparison with a high-risk target. Thus, optimism about one’s own risk may reflect a lack (or avoidance) of specific information or knowledge about the target that permits observers to construe that target in a manner so as to enhance his or her apparent risk relative to their own (Alicke, Klotz, Breitenbecher, Yurak, & Vredenburg, 1995; Perloff & Fetzer, 1986). People often fail to recognize that the same factors that they believe make them exempt may apply to

others as well. In fact, optimistic bias declines when comparing with a specific, individualized target (Alicke et al., 1995). As suggested earlier, in the case of STDs, this is partly due to the fact that social comparison processes related to STDs are not salient, as people seldom discuss the relation between sexual behaviors and infection (Covey & Davies, 2004). However, learning that *similar* others have experienced misfortune can lead a person to the conclusion that he or she is also vulnerable (Coates, Wortman, & Abbey, 1979).

### **Social Comparison and Similarity**

A central proposition of Festinger's (1954) social comparison theory is the hypothesis that people prefer to compare themselves with similar others. For example, perceived similarity to a target may be necessary for social comparison to have an impact (Tesser, 1988; Wills, 1987). Consistent with this argument, social comparison interventions have been shown to be more successful (i.e., have elicited increases in perceived vulnerability) when the behavior or personal characteristics of the participants are similar to those of the person presenting the personal testimony (e.g., Rothman et al., 1999). In addition, decreasing the favorability of this similar comparison target can reduce willingness to engage in the behavior (e.g., Stock et al., 2007).

In one study, female college students were asked to socially compare themselves with a target who engaged in unprotected sex at the risk of exposure to an STD (Thornton, Gibbons, & Gerrard; 2002, Study 1). Target similarity was manipulated by varying the number of personal attitudes on which the target and the participant were in agreement. Results indicated that when students compared with a similar target, their perceptions of the target predicted their willingness to engage in risky sex, but their perceptions of vulnerability did not. Comparison with a dissimilar person, however, led to

the opposite finding--target perceptions did not predict willingness, but perceptions of risk did.

In a related study, the participants (all female), read a description of a sexually active student who was again either attitudinally similar or dissimilar to them and inconsistent in her use of contraception (Thornton et al., 2002, Study 2). Participants indicated how similar they thought they were to the target, provided an evaluation of her, and then indicated their own willingness to have unprotected sex. Participants' evaluations interacted with perceived similarity to predict willingness: the more favorable participants' evaluations were, the higher their willingness, but only when social comparison was encouraged with the manipulation of perceived similarity. Thus, social comparison with a similar target may lead to increased willingness to engage in the behavior when the image of the comparison target is favorable. However, having an unfavorable image of the similar comparison target (e.g., due to a disease or unintended pregnancy) can lead to comparisons that are biased toward finding differences between the self and the target, i.e., is likely to result in lowering willingness to engage in the same behaviors that led to the comparison targets' negative image.

This process of finding dissimilarities from an image or comparison other has been labeled distancing (Gibbons, Gerrard, Lando, & McGovern, 1991), or what Willis (1981) called active downward comparison. Active downward comparison is a motivated type of comparison in which the comparer looks for evidence of distinction between the self and the comparison target (Gibbons & Gerrard, 1995). Distancing from a comparison target can lead to lowered perceptions of vulnerability. For example, Gump and Kulik (1995) exposed college students to a comparison peer who was or was not said to be HIV positive. As expected, those exposed to the HIV positive target rated this

individual as less similar to themselves than did participants who were exposed to an HIV negative peer. More important, those who were exposed to the HIV positive target lowered their perceptions of the riskiness of their own HIV-relevant traits and behaviors more than did those who were not exposed to the HIV target.

It has also been suggested that an infected comparison target (e.g., one that is HIV-positive) might be more effective at increasing both perceived vulnerability and performance of health-protective behaviors, if the comparison target is seen as being highly similar rather than dissimilar to the self (Weinstein, 1988, Weinstein & Klein, 1995). Students watched an HIV prevention video that included six HIV-positive interviewees who were similar to them in terms of age, appearance, sexual history, and sexual orientation. When assessed one month later, levels of perceived vulnerability and condom use were both found to have increased (Fisher, Fisher, Miscovich, Kimble, & Malloy, 1996). Similarly, in an examination of affiliation preferences of members of a smoking cessation group, preference for other members who were successful at quitting was associated with distancing from the typical smoker (Gerrard, Gibbons, Lane, & Stock, 2005). This distancing (i.e., decrease in perceived similarity) was, in turn, related to subsequent smoking cessation. Thus, psychological distancing from a similar-risk comparison target that engages in the negative behavior can have positive health-related benefits, such as increasing perceived vulnerability and decreasing willingness to engage in risk behavior. When comparing with a target whose level of risk behavior is dissimilar, however, defensive processing may occur in response to threatening health messages.

### **Risk Status, Health-Threats, and Health Cognitions**

When presented with a message that threatens their sense of physical or emotional security, many individuals engage in defensive mechanisms to reduce the threat (e.g., Leventhal, 1970; Sherman, Nelson, & Steele, 2000). This motivation to process defensively is likely increased among those at high-risk, particularly when they encounter risk-relevant information via a social comparison target. This is especially likely to happen after they have reviewed their past sexual history.

People tend to overlook or downplay their own risk-increasing behaviors and often fail to recognize that others may engage in risk-reducing behaviors as well. As a result, those who review their risk status on a number of health behaviors often end up increasing their illusions of invulnerability (Weinstein, 1980, 1982, 1984). For example, when female Marine Corps recruits were asked to review their own pregnancy risk behaviors (frequency of failure to use protection), their optimistic bias increased (Gerrard, Gibbons, & Warner, 1991). When people are sufficiently motivated (i.e., the health information is both threatening and personally relevant), message processing may be biased in such a way as to arrive at a particular conclusion (e.g., Kunda 1987, 1990). Specifically, people for whom a health message is highly relevant are more likely to scrutinize the information and look for reasons to discredit it (Kunda, 1987). For example, coffee drinkers were more critical of scientific evidence linking coffee drinking to breast cancer than were non-coffee drinkers. In a similar study, relative to non-drinkers, coffee drinkers reported more fear and reported less belief in the information they read about the link between coffee and fibrocystic disease (Liberman & Chaiken, 1992). Thus, high personal relevance can defensively bias message processing and

those who have the most to gain or learn from the information may receive the information, but end up being the least likely to accept it.

When individuals perceive threat, they may employ strategies that enable them to ignore and distort the threatening message, undermining risk perceptions (Brown, 2001). For example, when faced with anti-smoking messages, smokers tend to evaluate the messages as less effective than do non-smokers (Freeman, Hennessy, & Marzullo, 2001), and they are less likely to increase their intentions to quit smoking than smokers faced with non-threatening messages (Falomir & Invernizzi, 1999). Likewise, when presented with an anti-drinking and driving PSA, binge drinkers and drunk drivers were more likely to rationalize their behaviors, less likely to respond to the PSA, and rated themselves lower on fear and consequences associated with the behavior than did those who did not binge drink or drive after drinking (Gotthoffer, 2001).

Those who have engaged in intercourse may also be more likely to display defensive responses to AIDS or STD messages (Blumberg, 2000). For example, sexually active and virgin participants watched an emotional AIDS prevention video that included personal testimonies from young adults who were HIV-positive (Morris & Swann, 1996). The virgins reported higher perceptions of risk for HIV in the next five years, whereas sexually active participants who watched the film reported the lowest perceptions of future risk. Similarly, high-risk sexually active college students who were given pamphlets about STDs or pregnancy risk exhibited some reactance (Brehm, 1966) by decreasing their risk estimates (Wiebe & Black, 1997). These participants were also more likely to avoid exposure to information implicating their risk than were low-risk participants.

High-risk individuals are more likely to act in a more defensive manner and respond to health messages through heuristic-based processing (e.g., increasing optimistic biases) than are those at lower-risk. Health-risk cognitions are even more likely to be affected when heuristic-based comparison information is included in health messages than when analytic or prevalence based information is presented (e.g., PSAs or informational pamphlets) (e.g., French, Sutton, Marteau, & Kinmonth, 2004; Klein, 1997). For example, in one experimental study, female college students who were either at low-risk sexually (virgins or only 1 steady sexual partner) or high-risk (multiple sexual partners) were assigned to one of three conditions in which they heard: a) other students discuss their sexual behavior via audio-tape (i.e., image-based comparisons), b) an audio-tape that gave accurate statistics on the frequency of sexual contact among students on campus (i.e., quantitative information), or c) nothing (Gibbons et al., 2007). In terms of changes in willingness to engage in casual sex, the high-risk participants who heard the image-based comparison information stood out. This group actually increased their willingness to engage in risky sex after they heard other students discussing their sexual behaviors on tape, especially if they had high levels of self-esteem. Thus, it has been shown that comparison information can have a stronger impact than more analytical information. Additionally, high-risk individuals engage in more defensive processing than those at lower risk, even more so when social comparison is involved. What is not known, however, is what happens if the comparer (i.e., recipient of the health message) has engaged in the behavior multiple times, without any negative consequences, and then is faced with the message “it only takes one time.”

### **ABSENT-EXEMPT COGNITIONS**

Individuals have been shown to be more optimistically biased (i.e., to view themselves as relatively invulnerable to negative consequences) for health problems they perceive are controllable and for behaviors, such as sex, they can potentially engage in repeatedly without negative consequences (Moore & Rosenthal, 1991; Weinstein, 1982). Most adolescents decrease their conditional risk judgments about sexual activity over time, but the amount of decrease is significantly larger for those engaging in the risky behavior (Millstein & Halpern-Felsher, 2001). Although young adults engaging in sex are aware of the risks associated with sexual activity, many envision themselves as an exception to experiencing the risks (“I know my partner... he/she is a good, clean person,” etc.), reinforcing their optimistic bias (Chapin, 2001). Thus, individuals who have engaged in a lot of risky behavior but have not (yet) experienced any negative consequences may feel relatively exempt from risk. This belief may put them at an even greater risk of suffering harmful consequences.

The current study explored the influence of personal risk status and health-risk information on the heuristic-based cognitive process known as absent-exempt thinking. Absent-exempt thinking is the belief that if one has not experienced negative health consequences, in spite of having engaged in the behavior (a lot), then one is unlikely to do so in the future (Weinstein, 1984, 1987). Feelings of being exempt may very well be enhanced by the language that some educational programs or PSAs use, such as telling adolescents not to have unprotected sex because “it only takes once” to get pregnant or contract an STD, or by including low-risk infected peers as examples of this message (e.g., Advocates for Youth, 2006; Carr, 2006; Intermedia, 1986). This is especially true among adolescents and young adults who have not experienced any negative physical

consequences after multiple unsafe sexual encounters. Threatening health messages that do not seem personally relevant (based on their own uninfected past) to high-risk engagers, may increase endorsement of absent-exempt (e.g., Liberman & Chaiken, 1992).

Whether individuals at higher risk decide to engage in precautionary behaviors depends to some degree on their perceived susceptibility to the potential negative consequences, which is based in part on their past experience. For example, the more young adults drive after drinking, the lower their perceived risk of getting arrested for a DUI or getting in an alcohol-related accident is (Finken, Jacobs, & Laguna, 1998; Gibbons, Lane, Gerrard, Pomery, & Lautrup, 2002). One of the main reasons young drivers decide to continue drinking and driving is that their own crash-free and arrest-free experiences may lead them to conclude that their behavior is not that risky and that they themselves can get away with it—perhaps more than others who engage in the behavior (Basch, DeCicco, & Malfetti, 1989). Similarly, it was found that the more adults engaged in speeding behavior while driving, the lower their risk perceptions of speeding became over time (Brown, 2005). If no negative outcomes are experienced, these individuals are likely to increase their optimistic beliefs that their risk is below average, and thus, repeat their risky behaviors. The more they have engaged in the behavior without consequences, the more likely they are to decide they are somehow immune to those consequences.

In spite of its potential significance, there have been very few studies conducted on absent-exempt endorsement. Absent-exempt endorsement has been studied in relation to breast cancer (Gerend, Aiken, West, & Erchull, 2004). In spite of the fact that risk increases with age, older women were more likely than younger women to endorse

feelings of absent-exempt (“If a woman my age has not gotten breast cancer by now, she is unlikely to in the future”), resulting in lower levels of general perceived vulnerability to breast cancer. In addition, absent-exempt endorsement was associated with lower perceived vulnerability to osteoporosis and coronary heart disease. The longer the women had lived without breast cancer, osteoporosis, or heart disease, the less vulnerable they felt they would be in the future to those diseases. Moreover, this study also found that similarity to others with the disease was associated with increased perceived vulnerability and decreased endorsement of absent-exempt. The authors concluded that interventions should target similarities between those with the disease and unaffected audience members.

### **Absent-Exempt Cognitions, Risk-Status, and Social Comparison**

The current study is an extension of an ongoing program of research being conducted to further understand the notion of absent-exempt thinking (Stock et al., 2007). This research has shown that high-risk college students (i.e., those who have had multiple sex partners without using condoms) and high-risk highway workers (i.e., those who work outdoors and engage in very little, if any, sun protection behavior) who have not experienced negative consequences of their behaviors were more likely to endorse absent-exempt thinking (e.g., “If I have not gotten an STD/skin cancer by now, then I am not likely to in the future”). Absent-exempt endorsement, in turn, was related to lower conditional perceived vulnerability, danger, and worry, and higher willingness to engage in the risky behavior in the future. In addition, this research has shown that the social comparison process plays a role in absent-exempt thinking.

### Absent-exempt Cognitions, Social Comparison, and Sexual Risk-Status

This endorsement of absent-exempt (including perceived vulnerability and willingness) can be manipulated (increased or decreased) via social comparison. Stock and colleagues (2007, Study 1) showed a significant Participant Risk (high vs. low) by Target Risk (high vs. low) by Social Comparison Orientation (high vs. low) interaction. High-risk college students comparing with high-risk targets who were infected with herpes reported lower willingness and higher perceived vulnerability versus those who compared with low-risk infected targets. In addition, low-risk participants who compared with the low-risk infected target reported higher perceived vulnerability and lower willingness than those who compared with high-risk targets. Both of these tendencies were even stronger among high social comparers (see Figures 2 and 3). Thus, comparison with a similar-risk target who engages in the risky behavior can have positive health-related benefits, such as increasing perceived vulnerability and decreasing willingness to engage in risk behavior.

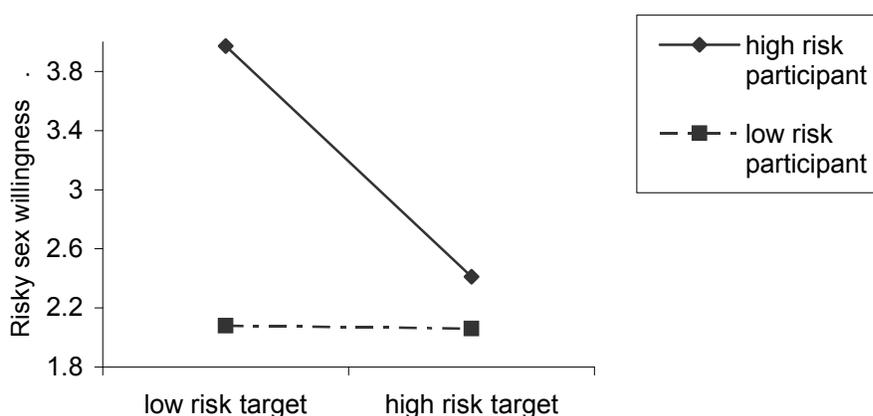


Figure 2. Willingness to have sex without a condom as a function of participant-risk and target-risk for high social comparers.

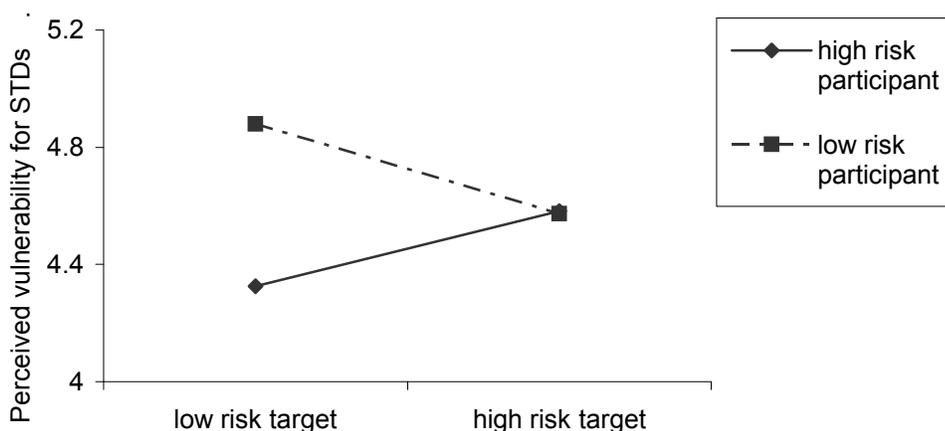


Figure 3. Perceived vulnerability to STDs as a function of participant-risk and target-risk for high social comparers.

The process of comparing with a peer can have potentially negative effects for high risk individuals when comparing with peers who had engaged in lower levels of risk behavior, but had experienced negative consequences. High-risk college students who heard about others their age and gender who were at *lower* risk, but suffered negative consequences nonetheless (i.e., contracted an STD), engaged in what appeared to be absent-exempt thinking; they reported the highest levels of willingness, lowest conditional perceived vulnerability (see Figures 2 and 3), and had the most favorable images of those who engage in the risk behavior. Once again, these findings were stronger among students with a tendency to socially compare. Although this finding among these high-risk students is an example of absent-exempt thinking, Study 1 did not include a direct measure of absent-exempt endorsement.

### **Absent-Exempt Cognitions, Social Comparison, and Sun Exposure**

In a related study, high-risk outdoor highway workers (i.e., worked outdoors approximately 8 hours/day with little sunscreen use) who had not been diagnosed with any forms of skin cancer were randomly assigned to read about another Department of

Transportation road worker their age and gender who was either: at *lower* risk (i.e., worked outdoors only 2 hours/day) or also at high-risk (i.e., also worked outdoors 8 hours/day), and who either had suffered negative consequences (i.e., had skin cancer) or had not (i.e., no skin cancer) (Stock et al., 2007, Study 2). Similar to the previous study, after reading about a lower-risk target who had been diagnosed with skin cancer, these high-risk participants reported the highest levels of willingness to go boating without sunscreen (see Table 1), highest levels of absent-exempt endorsement, and lowest levels of conditional perceived vulnerability. The men who compared with the lower-risk, but infected target, also reported the lowest estimates of sun protection by their co-workers.

**Table 1: Mean Level of Willingness by Target Risk-level and Target Cancer Diagnosis**

Skin Cancer Diagnosis		Target Risk level	
		Low-risk	High-risk
No		5.00	5.34
Yes		5.92	4.78

In addition, among the high-risk outdoor workers, absent-exempt endorsement was positively associated with the statement “Men who get skin cancer are just unlucky,” But negatively with the belief that “Sun exposure is a primary cause of skin cancer.” In fact, as one 55-year old worker indicated when asked why he felt “exempt:” “I have worked outside most of my life, and have not had a problem, and I rarely use sunscreen.” These studies illustrate that higher-risk participants employ more defensive and heuristic-based processing, especially when comparing with a low-risk infected target, which can have the negative effect of increasing absent-exempt thinking. Once again, this research also suggests that interventions that involve threatening

information, e.g., “even one unprotected incident can lead to infection,” may backfire, leading these higher-risk individuals to increase their perception that they are “exempt.”

### **Changing Absent-Exempt Cognitions**

To examine if absent-exempt endorsement was malleable, a third study was conducted that included only high-risk sexually active college students (Stock et al., 2007, Study 3). These students were given the opportunity to hear from either a high- or low-risk sexually active peer who had been recently diagnosed with genital herpes. Before hearing the audiotape, however, the students read an “article” on a different health behavior, sun exposure (ostensibly the first part of a 2-part study). For half of the participants, this article also included a paragraph that mentioned the illogicality of absent-exempt thinking as it related to skin cancer. The purpose was to see if absent-exempt endorsement among high-risk participants could be decreased after more reasoned (i.e., less heuristic) processing was encouraged or activated.

Similar to the findings from the previous two studies, high-risk participants who were not given absent-exempt endorsement related information and heard from the low-risk target, reported the highest levels of absent-exempt endorsement and willingness, and lower levels of perceived vulnerability. However, when given the information intended to counter absent-exempt thinking prior to hearing about a lower-risk infected comparison target, high-risk college students reported the lowest levels of endorsement of absent-exempt and willingness (see Figures 4 and 5), the highest levels of vulnerability, and spent the most time reading information on STDs.

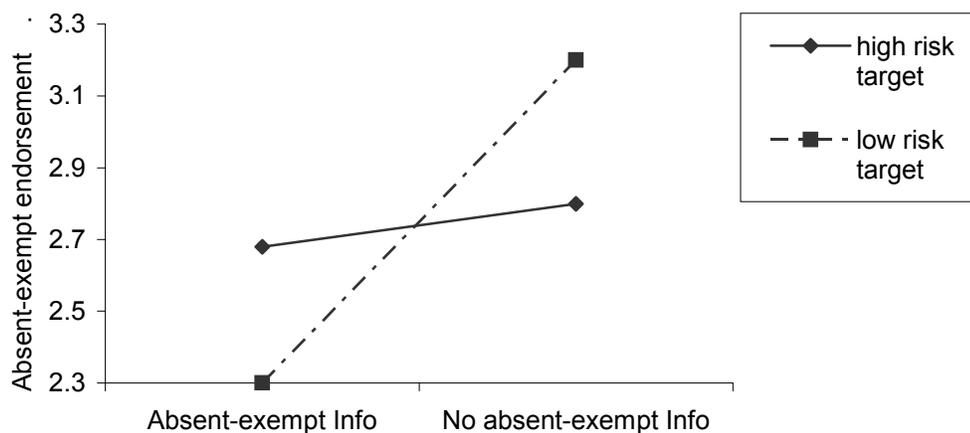


Figure 4. Absent-exempt endorsement (3-item, range 1-7) among high-risk participants as a function of information condition and comparison target-risk.

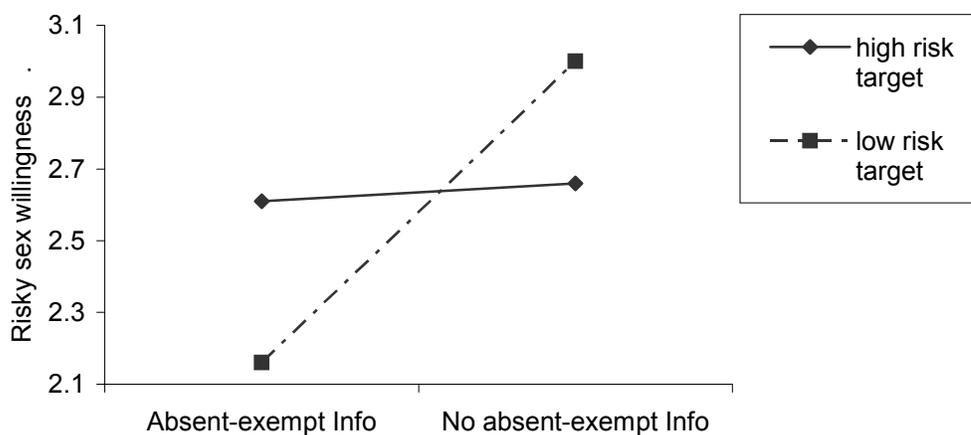


Figure 5. Willingness to engage in casual sex without a condom (3-item, range 1-7) among high-risk participants as a function of absent-exempt information and comparison target-risk.

Thus, there is evidence that absent-exempt thinking is malleable. These findings relate back to the dual-processing nature of adolescent decision-making and the prototype/willingness model. When adolescents are encouraged to think in a more reasoned manner, for example, by being told about the illusory nature of absent-exempt thinking, this influences later analytical processing and they are less likely to engage in

absent-exempt related thinking. Engaging in more heuristic processing, however, leads to greater underestimation of the risks associated with unhealthy behavior—even more so for those actually engaging in the behavior to a greater degree (e.g., Gerrard, Gibbons, Benthin, & Hessling, 1996).

What is not known is to what degree *social* comparison is involved in or necessary for absent-exempt thinking to take place. For example, will absent-exempt endorsement increase among high-risk participants who hear the message “it only takes one time,” in a format or mode that does not involve social comparison (i.e., a PSA)? In addition, previous studies did not include a control condition and there were no low-risk participants in the studies with measures of absent-exempt endorsement. The current study was designed to further examine the impact of the comparison process on health cognitions, in particular, absent-exempt thinking.

### **Absent-Exempt Cognitions and Intentions**

Although a consistent pattern of defensive/reactance processing among those at high-risk has been seen within the previous absent-exempt endorsement research on measures of willingness to engage in risk behaviors, a different pattern has emerged with less heuristic-based measures, specifically, with measures of behavioral intentions. Consistent with the dual-processing nature of the prototype/willingness model, previous studies have not found that high-risk groups differ from lower-risk groups in the *lowering* of their *intentions* to engage in risky sex (Gibbons et al., 2007; Stock et al., 2007). In addition, after hearing an HIV positive comparison target talk about their experiences, intentions to be tested for HIV were high and were not associated with decreases in their perceptions of risk (Gump & Kulik, 1995). This supports the contention of dual-process theorists who suggest that people process information through both analytic and

heuristic modes (Boyer, 2006; Brainerd & Reyna, 1992; Stanovich, 2004). Thus, people may respond to health threats in two different ways (reasoned and reactive). High-risk participants may report lower levels of vulnerability, especially when faced with more image-based comparison information, in part because optimistic biases make them feel better when they are faced with threatening circumstances (e.g., Taylor & Brown, 1988). They may, however, turn to more reasoned processing and exhibit “windows of realism,” under these circumstances (e.g., Taylor & Brown, 1988). Prior to Stock et al. (2007), previous studies involving absent-exempt thinking did not include measures of logical or reasoned processing, such as intentions to get tested for diseases or illnesses. As mentioned earlier, because intentions are less heuristic and less affected than willingness by social factors (like comparison with others), it was expected that the pattern of defensive responding shown by high-risk participants when comparing with low-risk targets would be less evident on intentions. Thus, the current study also explored whether the anticipated pattern of heuristic processing would be replaced by more reasoned processing when participants were asked about their intentions to get tested for an STD. An exploratory measure of negative affect was also included in order to examine if feelings of negative affect are associated with intentions to get tested and the other risk-cognitions.

### **Social Comparison Process and Moderation**

The degree to which comparison activity affects cognitions also can vary with the comparer’s tendency to socially compare. Individuals who engage in social comparison more often are more likely to pay attention both to the similarity and to the dissimilarity between themselves and the target and to the image or social consequences associated with engaging in the behavior. In examining the role of social comparison tendency as a moderator, Gibbons and Gerrard (1995) reported that risk prototypes had more impact for high (frequent) social comparers than for low (infrequent) social comparers. In a

subsequent study, this finding was replicated using the Iowa-Netherlands Comparison Orientation Measure (Gibbons & Buunk, 1999): The paths from prototype to behavioral willingness were significantly stronger for students who were high in social comparison tendencies versus those low in social comparison tendencies (Gibbons et al., 1998). More recent research has shown that low-risk participants who heard from an infected low-risk comparison target reported higher vulnerability to STDs and lower willingness to engage in risk behavior than were high-risk participants who also heard from the low-risk target. These findings were stronger among those who engaged in social comparisons frequently (Stock et al., 2007). Thus, past research has demonstrated that participants who tend not to compare are not as affected by the comparison target. If the process of absent-exempt thinking does involve social comparison, it should be stronger for those who are higher in social comparison tendencies.

## PRESENT STUDY

The purpose of the current study was to explore the effects of differing modes of presentation of STD information and social comparison tendencies on risk cognitions (willingness and prevalence estimates, endorsement of absent-exempt, favorability of risky sex prototypes, and perceptions of vulnerability). The design of the study was a 3 (Information Mode: Social Comparison Target vs. PSA vs. Control) X 2 (Participant Risk: high vs. low) X 2 (Social Comparison Orientation: high vs. low) factorial. Specifically, participants at either high or low risk of contracting STDs were randomly assigned to listen to a social comparison target who was a STD-positive student who had engaged in low-risk sexual behavior (i.e., sex with one partner only a few times without a condom), to hear a PSA that emphasized “it only takes one time,” or to hear no information about STDs. Genital herpes (HSV-2) was chosen as the target disease for this study because of its high prevalence, asymptomatic nature, and life-long threat. The prior risk behavior of the STD-positive comparison target provided an objective basis for judging risk similarity between the participant and target. Past risk behavior was made salient by having participants write about their own past sexual behaviors.

Because low-risk participants were expected to employ less defensive processing, they were expected to increase conditional perceived vulnerability and lower their willingness and absent-exempt endorsement (Gibbons & Gerrard, 1995; Rothman & Schwarz, 1998). In addition, given that people are more responsive to vivid testimonials and information on real people than they are to basic facts or analytic based information (French et al., 2004; Tversky & Kahnemen, 1974), it was expected the social comparison target would have a stronger impact on the risk cognitions than a PSA message would. To examine if participants felt the comparison condition did have a

stronger impact, participants were asked to indicate how much impact they thought the study had.

Based on the prototype/willingness model, the relatively unfavorable image (due to their STD infection) of a target similar in risk behavior was predicted to result in lower willingness and higher conditional perceived vulnerability among low-risk participants. A lowering of absent-exempt endorsement was expected to correspond with these cognitions. Thus, it was hypothesized that lower-risk participants who were exposed to a similar (low-risk) comparison target who had an STD would report: lower endorsement of absent-exempt, lower willingness, and higher conditional perceived vulnerability than those hearing a PSA or receiving no information.

This impact was predicted to be in *opposite* directions for the high-risk participants. It was hypothesized that high-risk participants who were exposed to the low-risk comparison target would: be more defensive, endorse absent-exempt more, have lower conditional perceived vulnerability, and report higher willingness and estimated prevalence of others engaging in the risk behavior when faced with the social comparison target versus hearing a PSA or receiving no information. After hearing from a peer who contracted an STD after just a few risky encounters--whereas they have engaged in even riskier behaviors without contracting a disease--they may deduce that they themselves must be somehow immune (or at low risk) to STDs. Thus, they may feel they do not need to alter their behaviors. It was also predicted that because of their defensive processing, high-risk participants would spend less time reading information about genital herpes than would low-risk participants; this effect would also be strongest for participants in the social comparison target condition.

Because high comparers are more affected by comparison information it was hypothesized that the predicted interactions between information mode (social comparison target, PSA, and control) and participant sexual risk level (high versus low) would be stronger among those who engage in social comparison more often. Finally, it was expected there would be a main effect for participant risk, such that high-risk participants will report higher levels of risk promoting cognitions (willingness, absent-exempt endorsement, prototype favorability, and estimated prevalence (i.e., percent engaging in the risk behavior), and lower perceived vulnerability) than would low-risk participants.

To summarize, the following specific hypotheses were tested:

- 1) Participant risk level would interact with information mode such that:
  - a) High-risk participants in the social comparison group would report the highest levels of risk cognitions, (willingness, absent-exempt endorsement, prototype favorability, and estimated prevalence, and low perceived vulnerability), whereas high-risk participants in the control condition would report lower levels of the risk promoting cognitions. High-risk participants in the PSA group would report moderate levels of these cognitions.
  - b) The opposite pattern was predicted for low-risk participants: They would report the lowest levels of risk promoting cognitions when they compared with the social comparison target and highest levels in the control condition. Moderate levels were expected in the PSA condition.
- 2) These social comparison effects would be moderated by individual differences in the tendency to socially compare; i.e., the impact of social

comparison information would be greater on those who are high in social comparison tendencies (see Figure 6 for predicted pattern).

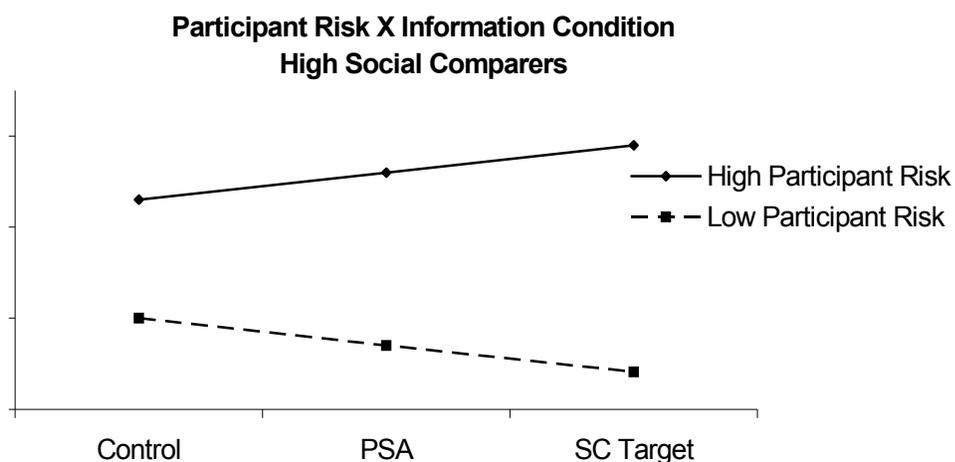


Figure 6. Hypothesized Information Mode by Participant-risk interaction on risk-cognitions.

- 3) Absent-exempt endorsement would mediate the anticipated effect of the manipulation and participant risk level on willingness among high comparers.
- 4) Participant risk level and information mode would also interact to produce differences in exposure time to the written information on genital herpes (e.g., symptoms, treatment). High-risk participants would spend more time reading in the control condition, moderate levels in the PSA condition, and lower levels when they compare with the social comparison target. Again, the opposite pattern is predicted for low-risk participants. They would spend more time reading when they compared with the social comparison target, moderate levels in the PSA condition, and lower levels in the control condition.

- 5) Evidence of more heuristic based processing that was expected on the health-risk cognitions would not be evident on intentions to get tested for an STD in the future.

## METHOD

### Participants

College students in introductory-level psychology courses were recruited as participants. Students who chose to participate in a pre-testing session that qualified them for additional studies completed a questionnaire approximately 1-2 months before participating in the lab study (T1; see Appendix A). Included in the questionnaire were items regarding their number of sexual partners, frequency of condom use, prior history of STDs, willingness to engage in risky sexual behavior, absent-exempt beliefs related to STD infection, risky-sex prototypes, perceived vulnerability to STDs, and social comparison tendencies. Based on the questionnaire responses, participants who had sex without a condom, were not married, and had not been diagnosed with an STD were called and asked if they would be willing to participate in a study dealing with health behaviors and attitudes. A total of 222 undergraduate students participated in the study (88 males and 134 females). The participants averaged 20.5 years of age (range = 19-27). Each participant earned extra credit for his or her psychology class for participation in the screening session and the experiment.

### Procedure

The experiment was run by a same sex experimenter and in same sex pairs. Upon arriving in the lab, the students were told the study concerned psychological reactions to health problems and reactions to exposure to different types of health-related information. Participants were also told that the study concerned how college students' personal knowledge, behaviors, and attitudes influence their reactions to information on specific health problems. To examine this, participants were told they

would fill out a questionnaire concerning these issues along with writing about their own health attitudes and behaviors.

Those assigned to the social comparison target condition were told that the study was investigating their reactions to others their age experiencing specific health problems. The experimenter explained that they would hear from an ISU student who agreed to discuss a personal health issue he or she is dealing with, and after listening to the tape, they would be asked to write about their reactions. Participants assigned to the PSA condition were told that the study was investigating their reactions to information about a health issue that may affect students on campus. Both tapes included the same basic information on being diagnosed with herpes (see Appendices D and E). All participants were told they were randomly assigned to hear about herpes versus other health issues.

Participants were given an informed consent form to read and sign if they agreed to participate in the study (see Appendix B). The experimenter then led each participant to his or her own separate cubicle. After demonstrating how to use the computer and call switch, the experimenter left the participants alone in their cubicles to ensure privacy. All experimental materials, excluding the audiotape, were presented through MediaLab software. The experimenter instructed each participant to follow the directions presented on the computer. All participants first answered a series of questions asking them about their sexual behaviors (e.g., number of partners, condom use; see Appendix C).

Participants assigned to the social comparison target condition heard an audiotape from a low-risk (i.e., only 1 sex partner) same-sex comparison target who was coping somewhat poorly with having genital herpes (see Appendix D). To evoke general similarity, the comparison target discussed having some similar demographic

characteristics as the participant (e.g., same age, gender, school). The target spoke about his or her past sexual history, testing positive for the disease, and how he or she was coping with the virus.

Participants assigned to the PSA condition heard an audiotape of a health clinic employee discussing a health problem described as fairly common on campus. The same-sex adult discussed testing positive for genital herpes and the effect this may have on college-aged students (see Appendix E). The tape was similar to the social comparison target tape in terms of information that was presented and both emphasized low-risk behavior can result in negative consequences. Both audiotapes lasted approximately three minutes. Control participants did not hear an audiotape and went directly to the questionnaire. After playing the audiotape, participants next completed a questionnaire that assessed willingness, absent-exempt endorsement, perceived vulnerability, risky sex prototype favorability and similarity, and additional exploratory dependent measures (T2; see Appendix A). All students were reminded they could skip any questions they did not feel comfortable answering.

Participants were then asked to continue on to the next screen, which contained general information about genital herpes (see Appendix F). Before reading the information, they were told the researchers were interested in how well college students are able to remember information typically found in informational pamphlets on a specific health problem. Participants then read the information and signaled when they were finished. Amount of time spent reading the information was recorded by the computer.

The experimenter next probed for suspicion and fully debriefed the participants. They were informed that the student on the audiotape did not have herpes and was

reading from a script. Participants were given reasons for the deception and the study. They were also be given information regarding safe sex and STDs along with the phone numbers of the Student Health Center and Student Counseling Services.

### Measures

**Social comparison.** At T1, social comparison orientation was assessed with a shortened version of the Iowa-Netherlands Comparison Orientation Measure (INCOM; Gibbons & Buunk, 1999). This instrument provides respondents with a general description of social comparison, followed by six statements (e.g., “I often compare myself with others with respect to what I have accomplished in life.” “I often compare how I am doing socially (e.g., social skills, popularity) with other people.”). Each item was followed by a 1-5 point scale labeled “I disagree strongly” to “I agree strongly” ( $\alpha = .76$ ). The median score on the INCOM, used in later analyses to separate high and low social comparers, was 3.5 (range = 1-5).

**Participant risk level.** Pre-manipulation sexual practices were assessed by asking participants in an open ended format “How many steady partners have you had in your lifetime?” Condom use was assessed by asking “How often have you used a condom in these relationships?” followed by a 7-point scale (1=*never*; 7 = *all the time*). The same questions were asked for casual partners, defined as “not being a serious or steady dating partner”. The condom use scores were reverse coded so that higher scores represented higher risk. As in previous studies, participant risk behavior was computed by multiplying the number of (steady and casual) partners with the frequency of condom use for each type of partner [(# Steady Partners X Frequency of Condom Use) + (# Casual Partners X Frequency of Condom Use)] (Gerrard & Warner, 1990; Gerrard & Warner, 1994; Van der Velde, van der Pligt, & Hooykaas, 1994; Wu et al.,

2005). The participant risk level score averaged 12.8 (range = 1-66). Because the risk behavior scores were skewed in the direction of high-risk, these scores were log transformed and standardized.

**Willingness.** To assess behavioral willingness to engage in risky sexual behavior at both T1 and T2, participants were asked to read about two hypothetical situations that are common for students their age and then asked to indicate how willing they would be to engage in several specific behaviors if they were in that situation. Willingness to have sex with a casual partner was assessed by asking participants “suppose you are at a party and start talking with a man/woman whom you find very attractive and are enjoying hanging out with, and at the end of the evening you both want to be alone, but you do not have a condom with you. How willing would you be to \_\_\_?” Willingness to have sex with a steady partner was assessed by asking “suppose you are on a date with your boy/girlfriend and you want to have sexual intercourse, but neither of you has a condom. How willing would you be to \_\_\_?” The participants responded to each scenario with the following items: 1) have sex without a condom, 2) have sex and use withdrawal, 3) go home alone, each on a 7-point scale (1=*not at all willing*; 7 = *very willing*). Questions assessing going home were reverse coded. All six items were averaged to form a willingness index at pre-test and post-manipulation ( $\alpha$ s = .83 & .85, respectively).

**Absent-exempt endorsement.** Participants were asked to indicate how strongly they agreed with three statements related to absent-exempt beliefs: “If I haven’t gotten an STD by now, I’m probably not going to get one...even if I don’t always use protection...because I am lucky” (1 = *Strongly disagree*; 7 = *Strongly agree*). These

three items were combined at both pre-test and post-manipulation ( $\alpha$ s = .76 & .78, respectively).

**Perceived vulnerability.** *Conditional perceived vulnerability* was assessed by asking “If you were to have sex with a (casual/steady) partner without a condom, what do you think the chances are that you would get an STD?” and “If you were to have sex without a condom, what do you think the chances are that you would get an STD?” followed by a 7-point scale (1= *not at all likely*; 7 = *very likely*). Perceived vulnerability was also assessed by asking “If the typical ISU student your age and gender were to have sex with a (casual/steady) partner without a condom, what do you think the chances are that they would get an STD?” followed by a 7-point scale (1= *not at all likely*; 7 = *very likely*). The five items were aggregated to form a measure of perceived vulnerability at both time waves ( $\alpha$ s = .78 & .80).

**Risky sex prototype.** Participants were asked to evaluate the typical person their age and sex who has sex without a condom, on six dimensions (e.g., attractive, careless) using a Likert-type scale from 1 (*not at all*) to 7 (*very*). These adjectives were combined to form a favorability index ( $\alpha$ s = .60 & .61). Participants also rated how similar they were to each prototype 1 (*not at all*) to 7 (*very*). Favorability and similarity were multiplied together to form the index at both T1 and T2 (Gibbons & Gerrard, 1995).

**Reading time.** The computer software recorded how much time participants spent reading the article on genital herpes. When participants were ready to read the information, they pressed a key on the computer keyboard, and when they were finished reading, they pressed the key on the keyboard once again. The software recorded the amount of time elapsed between keystrokes. A log transformation was performed on the time measured (range = 4.69 - 5.40 = 49-250 seconds). The amount of time spent

reading the initial instructions was also measured, log transformed, and served as a control variable for all reading time analyses.

**Estimated prevalence of sex without condom.** At T2 participants were asked “what percent of the ISU student population do you think engages in ...*casual sex without a condom... do not use a condom?*” These two items were combined to form the index ( $\alpha = .82$ ). Responses ranged from 11.5% - 94%.

**STD testing intentions.** Intentions to get tested for STDs within the next 6 month were assessed during T1 and T2 (1 = *not at all*, 7 = *definitely*).

**Negative affect.** A mood adjective checklist containing 4 items (anxious, worried, regretful, upset) was assessed post-manipulation (1 = *not at all*, 7 = *very*). The checklist was used in a previous study (Stock et al., 2007). The four adjectives were averaged to form the negative affect index ( $\alpha = .83$ ).

**Impact.** In order to examine if the comparison condition was more impactful than the PSA and control, participants were asked: “How impactful was the information you received today?” (1 = *not at all*, 7 = *very*).

## RESULTS

### General Analytic Strategy

It was hypothesized ( $H_1$ ) that a similar Condition by Risk Level pattern would appear on several of the health cognitions. A General Linear Model (GLM), Multivariate Analysis of Covariance (MANCOVA) was used to examine if the predicted pattern existed for the main dependent variables outlined in  $H_1$ . A MANCOVA allows a researcher to control for the experiment wide error rate, such as Type 1 errors, that can occur with repeated univariate procedures or when the multiple dependent variables are not highly correlated, as in the present study (see Table 2). Thus, a MANCOVA was conducted on the hypothesized 3 (Condition: Social Comparison Target vs. PSA vs. Control) X 2 (Risk Level: high- vs. low-risk participant) interaction across the following T2 dependent variables: absent-exempt endorsement, willingness, perceived vulnerability (reverse-coded), risky-sex prototype, and estimated prevalence, while covarying the T1 versions of these health cognitions. All variables were standardized for the MANCOVA analyses.

To take advantage of the continuous nature of social comparison tendencies and participant risk level, hierarchical multiple regression analyses were also used to examine the hypothesized interaction between condition and participant risk level, as well as the anticipated social comparison moderation of this interaction ( $H_2$ ). All regression analyses on willingness, absent-exempt endorsement, perceived vulnerability, and the risky sex prototype were conducted controlling for baseline measures. Analyses were also conducted on reading time, prevalence, STD testing intentions, and on negative affect. Simple slope tests were conducted on any significant interactions revealed in the regression analyses to further examine the nature of the

interaction. When an anticipated 3-way interaction was observed, additional regression analyses were conducted separately for high and low social comparison groups. In addition, when an anticipated Condition by Risk Level interaction was revealed, simple slope analyses examined the impact of condition on the risk-promoting cognition for low- versus high-risk participants. Finally, mediation analyses were conducted to examine if change in absent-exempt endorsement mediated the effect of condition and risk level (i.e., the interaction) on willingness to engage in sex without a condom ( $H_3$ ).

### **Descriptives**

The participants reported an average of 4.5 sexual partners (lifetime); 2.5 steady partners and 2 casual partners (total range = 1-34). Twenty-three percent reported having only one sexual partner, whereas 25% reported having 5 or more partners. When asked how often they had had sex without a condom, participants averaged 5 on a 7-point scale (1 = *never*; 7 = *all the time*). When separated into low and high-risk groups, using a median-split of their sexual risk score, the low-risk participants averaged 1.5 steady and 0.5 casual partners. High-risk participants averaged 3 steady and 4 casual partners.

An analysis of variance (ANOVA) revealed no differences between high- and low-risk levels or between conditions in participant social comparison level ( $ps > .10$ ; see Table 2 for cell counts). Table 2A includes the T2 absolute means for all risk cognitions included in H1 and Table 2B includes the T2 absolute means for reading time, intentions, and anxiety. Additional ANOVAs on the T2 risk cognitions found that, as expected, high-risk participants reported higher T2 willingness to engage in risky sexual behaviors ( $Ms = 2.5$  vs.  $3.6$ ,  $F(1, 221) = 35.5$ ,  $p < .001$ ,  $\eta^2 = .14$ ), and more favorable risky-sex prototypes ( $Ms = 13.0$  vs.  $16.5$ ,  $F(1, 221) = 13.2$ ,  $p < .001$ ,  $\eta^2 = .06$ ) than did

low-risk participants. In addition, high-risk participants tended to report lower levels of perceived vulnerability ( $M_s = 4.1$  vs.  $3.6$ ,  $F(1, 221) = 17.7$ ,  $p < .001$ ,  $\eta^2 = .07$ ). Males reported lower T2 perceived vulnerability, lower intentions to get tested and a greater number of casual partners ( $p < .01$ )<sup>1</sup>. No significant differences were found between high and low-risk participants' reports of the comparison targets' number of partners or frequency of condom use ( $p_s > .70$ ). High-risk participants did perceive the behaviors of the comparison target as less risky than did low-risk participants ( $M = 2.2$  vs.  $3.6$ ,  $F(1, 74) = 19.5$ ,  $p < .001$ ,  $\eta^2 = .21$ ).

Participants in the comparison condition reported the highest level of study impact, followed by the PSA, and control condition ( $M = 5.1$  vs.  $4.6$  vs.  $4.3$ ,  $F(2, 218) = 3.8$ ,  $p < .03$ ). There were no differences on T1 willingness, perceived vulnerability, or prototype favorability between conditions ( $p_s > .10$ ). There was, however, a significant difference in T1 absent-exempt endorsement among the three conditions,  $F(2, 221) = 4.83$ ,  $p < .01$  ( $M_s$ : control =  $2.7$ , PSA =  $2.89$ , comparison group =  $3.37$ ). All T1 dependent variables were treated as covariates in the remainder of all analyses.

**Table 2: Cell counts by Condition, Participant Risk, and Social Comparison Orientation**

	Low Social Comparers		High Social Comparers	
	Low-Risk Participant	High-Risk Participant	Low-Risk Participant	High-Risk Participant
SC Target	21	17	21	19
PSA	16	19	18	17
Control	16	20	16	22

Note:  $N = 222$ ; SC = Social Comparison Target condition, PSA = Public Service Announcement.

Table 2A: Mean Levels of T2 Risk-Cognitions by Condition, Social Comparison Level, and Participant Risk Level

	Control						Public Service Announcement						Social Comparison Target					
	Low Comparers		High Comparers		Low Comparers		High Comparers		Low Comparers		High Comparers		Low Comparers		High Comparers			
	Low risk	High risk	Low risk	High risk	Low risk	High risk	Low risk	High risk	Low risk	High risk	Low risk	High risk	Low risk	High risk	Low risk	High risk		
	<b>M</b>	<b>M</b>	<b>M</b>	<b>M</b>	<b>M</b>	<b>M</b>	<b>M</b>	<b>M</b>	<b>M</b>	<b>M</b>								
<b>Absent-exempt Endorsement</b>	2.11 (1.17)	2.16 (1.08)	2.29 (1.70)	2.19 (1.01)	2.00 (1.03)	2.15 (.87)	2.04 (1.26)	2.17 (.85)	2.11 (1.16)	2.00 (.98)	2.13 (.97)	2.81 (.89)						
<b>Willingness</b>	2.97 (1.33)	3.38 (1.61)	2.91 (1.40)	3.56 (1.04)	2.96 (.84)	3.20 (1.11)	2.50 (1.35)	3.55 (1.00)	2.35 (1.07)	3.72 (1.38)	2.31 (.96)	4.20 (1.41)						
<b>Prevalence</b>	48.36 (20.81)	40.74 (17.00)	54.50 (17.37)	46.85 (15.60)	48.96 (19.85)	44.59 (17.49)	48.76 (18.49)	44.12 (17.19)	43.15 (16.91)	51.50 (16.93)	40.16 (17.33)	56.09 (17.00)						
<b>Prototype</b>	9.90 (5.37)	15.09 (6.65)	13.93 (5.04)	18.71 (6.89)	11.40 (6.31)	14.51 (6.28)	14.69 (11.33)	16.94 (7.28)	12.94 (7.75)	17.26 (7.85)	13.28 (6.65)	18.29 (5.79)						
<b>Perceived Vuln. (rev.)</b>	3.95 (.87)	3.66 (.89)	4.00 (.93)	4.00 (.73)	4.16 (.79)	3.80 (.56)	4.10 (.79)	4.20 (1.04)	4.12 (.69)	3.48 (.69)	4.16 (.60)	3.33 (.78)						

Note: N = 222; Standard Deviations in parentheses; Prevalence = estimated percentage of non-condom users.

**Table 2B: Mean Levels of T2 Risk-Cognitions by Risk Level and Condition**

	Control		Public Service Announcement		Social Comparison Target	
	Low-risk	High-risk	Low-risk	High-risk	Low-risk	High-risk
	<u>M</u>	<u>M</u>	<u>M</u>	<u>M</u>	<u>M</u>	<u>M</u>
<b>Reading Time</b>	5.08 (.12)	5.10 (.11)	5.07 (.10)	5.09 (.09)	5.10 (.12)	5.07 (.13)
<b>STD Testing Intentions</b>	3.77 (2.22)	4.00 (2.16)	3.23 (2.41)	3.44 (2.12)	2.43 (1.93)	5.03 (2.07)
<b>Anxiety</b>	1.88 (.87)	2.18 (1.09)	1.67 (.78)	1.98 (.67)	2.23 (1.06)	3.24 (1.18)

Note: N = 222; Standard Deviations in parentheses; Prevalence = estimated percentage of non-condom users.

As presented in Table 3, three of the heuristic-based risk cognitions: post-manipulation willingness, risky-sex prototype favorability, and estimated prevalence of ISU students having sex without a condom were positively correlated ( $ps < .01$ ; italicized measures were included in the MANCOVA). In addition, perceived vulnerability to getting an STD was negatively associated with willingness to have sex without a condom and feelings of being exempt from future STD risk ( $ps < .05$ ). As expected, high participant risk status was related to higher levels of willingness, risky sex prototype favorability and similarity, intentions to get tested for an STD, and negative affect ( $ps < .001$ ). A higher level of negative affect was also associated with lower levels of absent-exempt endorsement and greater intentions to get tested for STDs ( $ps < .05$ ).

**Table 3: Correlations among T2 Dependent Variables and Participant Risk Level**

Variable	1	2	3	4	5	6	7	8	9
1. Willingness	-								
2. Absent-exempt Endorsement	.12*	-							
3. Perceived Vulnerability	-.47***	-.13*	-						
4. Risky Sex Prototype	.43***	-.05	-.13*	-					
5. Estimated Prevalence	.18**	-.08	.10	.09	-				
6. Reading Time	.02	-.04	.03	.03	-.05	-			
7. STD Testing Intentions	.07	-.13*	.05	.07	.11	.14*	-		
8. Negative affect	.09	.08	.01	.10	.04	.13*	.20**	-	
9. Risk level	.52***	.01	-.34***	.30***	.02	.08	.30***	.25***	-
Range	1-7	1-7	1-7	1-40	12-94	4.5-5.5	1-7	1-7	0-2.3
Mean	3.05	2.17	3.87	14.69	46.42	5.08	3.53	2.16	.88
Standard Deviation	1.37	1.01	.81	7.38	18.10	.11	2.26	1.07	.41

Notes.  $N = 222$ . \* $p < .05$ . \*\* $p < .01$ . \*\*\* $p \leq .001$ . Italicized measures included in the MANCOVA

## MANCOVAs

**Initial design: 3 (Social Comparison vs. PSA vs. Control) by 2 (High vs. Low-risk).** The overall MANCOVA revealed a significant main effect of risk level, Wilks = 0.91,  $F(5, 190) = 3.50$ ,  $p < .01$ , such that high-risk participants reported higher levels of the risk-promoting cognitions (see Table 4 for standardized means and Table 4A for multivariate tests). The condition main effect was not significant ( $p > .30$ ). A significant interaction effect was found on the dependent variables, Wilks = 0.85,  $F(10, 375) = 3.17$ ,  $p < .01$ . To specifically evaluate the effects of the Condition by Risk Level interaction on all health-risk cognitions, the information from the univariate between-subjects  $F$  tests in the MANCOVA were used. These results showed significant interactions for two of the five cognitions: prevalence and risky sex prototype ( $ps < .02$ ). Only willingness and perceived vulnerability showed significant associations with risk level, with higher risk participants reporting high levels of risk-cognitions ( $ps < .01$ ). As can be seen in Table 4,

the overall pattern was such that the high-risk participants in the social comparison target condition tended to report the highest levels on all risk-promoting cognitions, whereas the low-risk participants in this condition tended to report the lowest levels. Additionally, the PSA and control conditions had a similar pattern. With the goal of data reduction, three additional sets of 2 (Condition) by 2 (Risk-level) MANOVAs were conducted to further examine the pattern revealed in the initial MANCOVA.

**Table 4: Estimated Standardized Mean Levels of T2 Risk-Cognitions by Risk Level and Condition Covarying T1 Cognitions**

	Control		Public Service Announcement		Social Comparison Target	
	Low-risk	High-risk	Low-risk	High-risk	Low-risk	High-risk
	<u>M</u>	<u>M</u>	<u>M</u>	<u>M</u>	<u>M</u>	<u>M</u>
<b>Absent-exempt Endorsement Willingness</b>	-.08 (.16)	-.08 (.13)	-.11 (.15)	-.12 (.15)	-.19 (.13)	.38 (.15)
<b>Prevalence</b>	-.06 (.12)	.11 (.09)	-.20 (.11)	.11 (.11)	-.32 (.10)	.31 (.11)
<b>Prototype</b>	.16 (.18)	-.20 (.15)	.13 (.18)	-.14 (.17)	-.27 (.15)	.41 (.18)
<b>Perceived Vuln. (rev.)</b>	-.26 (.17)	.20 (.14)	.20 (.17)	-.12 (.16)	-.11 (.15)	.26 (.17)
	-.08 (.16)	-.02 (.13)	-.20 (.16)	.20 (.15)	-.37 (.14)	.38 (.16)

Note: N = 222; Standard Errors in parentheses; Prevalence = estimated percentage of non-condom users.

**Table 4A: Overall Multivariate Tests for the MANCOVA**

	<u>DF</u>	<u>Wilk's</u>	<u>F-value</u>	<u>p-value</u>
<b>T1 Willingness</b>	5	.50	37.05	.00
<b>T1 Absent-exempt</b>	5	.76	11.81	.00
<b>T1 Prototype</b>	5	.93	2.59	.03
<b>T1 Perceived Vuln. (rev.)</b>	5	.76	11.29	.00
<b>Condition</b>	10	.97	.53	.87
<b>Risk Level</b>	5	.91	3.48	.01
<b>Condition X Risk Level</b>	10	.85	3.17	.01

Note: N = 222; Prevalence = estimated percentage of non-condom users.

**2 (PSA vs. Control) by 2 (High vs. Low-risk).** GLM planned comparisons using Bonferroni multiple comparison adjustments were conducted on the five T2 risk-cognitions, covarying out T1. When comparing the control condition to the PSA

condition, the interaction between condition and risk level was not significant, Wilks = 0.98,  $F(3, 135) = .57$ ,  $p > .60$ . In addition, only one of the univariate tests for the dependent variables was significant, risky sex prototype ( $p > .02$ ; all other  $ps > .1$ ).

**2 (Social Comparison vs. Control) by 2 (High vs. Low-risk).** However, when comparing the control condition to the social comparison condition, the interaction between condition and risk level was significant, Wilks = 0.88,  $F(3, 135) = 5.84$ ,  $p = .001$ . In addition, the univariate between-subjects  $F$  tests in the MANCOVA revealed significant interactions for absent-exempt endorsement, perceived vulnerability, willingness, and estimated prevalence of no-condom users ( $ps < .05$ ), although the risky sex prototype was non-significant ( $p > .2$ ).

**2 (Social Comparison vs. PSA) by 2 (High vs. Low-risk).** A similar pattern was found when the social comparison condition was compared to the PSA condition; the interaction between condition and risk level was again significant, Wilks = 0.92,  $F(3, 124) = 3.09$ ,  $p = .03$ . The univariate between-subjects  $F$  tests in the MANCOVA revealed a significant interaction on T2 perceived vulnerability and absent-exempt endorsement ( $ps < .05$ ) and marginal interactions for T2 willingness and estimated prevalence ( $ps < .09$ ).

**High-risk comparison group.** As seen in Table 4, the high-risk comparison group stands out with the highest levels of risk cognitions among all cells. To further examine this, Bonferroni-adjusted pairwise comparisons of the estimated standardized mean levels on the risk-cognitions revealed that the mean levels of absent-exempt thinking, willingness, perceived vulnerability, and prevalence among the high-risk participants in the comparison condition were significantly different from each of the other five groups (all  $Fs > 4$ , all  $ps < .05$ ). The mean level of prototype favorability

among the high-risk participants in the comparison condition was not significantly different from each of the other high-risk groups ( $F > 4$ , all  $ps < .05$ ). In summary, the findings of the MANCOVAs and follow-up comparisons converge on our assumption that the comparison group was significantly different from the other two conditions, which were similar to each other. Due to these findings, the control and PSA conditions were collapsed together and an additional 2 (Condition: comparison vs. PSA and control (Non-comparison)) by 2 (Risk Level: low, high) MANCOVA was conducted.

**2 (Comparison vs. Non-comparison) by 2 (High vs. Low-risk).** This MANCOVA revealed a significant Condition by Risk Level interaction, Wilks = 0.90,  $F(5, 185) = 3.87$ ,  $p = .002$ , as well as a significant effect of risk level, Wilks = 0.90,  $F(5, 185) = 4.15$ ,  $p < .001$ , but no condition effects. In order to identify the effects of the Condition by Risk Level interaction on all health-risk cognitions, results from the univariate between-subjects  $F$  tests in the MANCOVA were examined. These results showed significant interactions for four of the five cognitions: willingness, absent-exempt endorsement, perceived vulnerability, and estimated prevalence ( $ps < .05$ ). Once again, a significant main effect of risk was found for willingness and perceived vulnerability, with higher risk participants reporting higher levels of risk-promoting cognitions ( $ps < .01$ ).

As can be seen in Table 5, the pattern for the significant 2-way interaction, as predicted, was that the lowest and the highest levels of the risk cognitions were reported by the two groups in the comparison condition. Specifically, low-risk participants in this condition reported the lowest levels of all five risk-promoting cognitions. Even more evident, is the finding that high-risk participants in the comparison condition reported the highest levels of risk-cognitions. Thus, as has been the case in our previous studies (Stock et al., 2007) among these at-risk participants, a consistent pattern emerged, such

that those in the comparison condition reported significantly higher levels of risk-related cognitions than any other groups.

**Table 5: Estimated Standardized Means of T2 Risk Cognitions by Risk Level and Condition Covarying T1 Risk Cognitions**

	Non-comparison				Comparison			
	Low-risk		High-risk		Low-risk		High-risk	
	<u>M</u>	<u>SE</u>	<u>M</u>	<u>SE</u>	<u>M</u>	<u>SE</u>	<u>M</u>	<u>SE</u>
<b>Absent-exempt</b>	-.14	.11	-.03	.10	-.17	.13	.22	.15
<b>Willingness</b>	-.09	.08	.11	.07	-.29	.10	.30	.12
<b>Estimated Prevalence</b>	.22	.13	-.13	.11	-.13	.16	.35	.18
<b>Risky Sex Prototype</b>	-.05	.12	.06	.11	-.12	.15	.32	.18
<b>Perceived Vuln. (rev.)</b>	-.16	.11	.09	.10	-.37	.14	.44	.16

Note: N = 222; SE= Standard Error.

### Correlations by Condition

In order to further examine the relation between condition and the dependent variables, correlation analyses were conducted separately for the comparison versus non-comparison condition (see Table 6). Willingness to engage in sex without a condom was marginally correlated with higher levels of absent-exempt endorsement among those in the comparison condition only ( $p < .08$ ). Another interesting (marginal) finding is that among participants who heard from the comparison target, willingness was associated with a higher estimated prevalence of sex without a condom, but greater intentions to get tested for an STD ( $ps < .07$ ). In addition, high-risk participants in this condition were more likely to estimate that others were having sex without condoms, and reported higher levels of absent-exempt endorsement ( $ps < .02$ ). Thus, as

expected, the comparison condition resulted in stronger correlations between risk level and risk-promoting cognitions.

**Table 6: Correlations among T2 Dependent Variables and Risk Level for Participants in the Comparison and Non-comparison Conditions**

Variable	1	2	3	4	5	6	7	8	9
1. <i>Willingness</i>	-	.11	-.39***	.48***	.09	-.01	-.01	.06	.47***
2. <i>Absent-exempt Endorsement</i>	.21+	-	-.09	-.02	.04	-.08	-.05	.07	.01
3. <i>Perceived Vulnerability</i>	-.48***	-.13	-	-.18*	.17+	.05	.09	.01	-.27**
4. <i>Risky Sex Prototype</i>	.33**	.03	-.03	-	.04	.01	.02	.11	.28**
5. <i>Estimated Prevalence</i>	.35**	-.05	-.11	.17	-	-.01	.01	.02	-.07
6. Reading Time	.05	-.04	-.01	.06	-.13	-	.20*	.14+	.09
7. Intentions to Get Tested	.22+	-.12	-.01	.16	.36**	-.03	-	.20*	.24**
8. Negative affect	.17	-.14	-.06	.10	.28*	-.08	.26*	-	.27**
9. Risk level	.59***	.28*	-.45***	.35**	.31*	-.08	.39***	.41***	-

Notes. N = 222. +p < .10, \*p < .05, \*\*p < .01, \*\*\*p ≤ .001. Italicized measures included in the MANCOVA. The correlations from the Comparison (Non-comparison) groups are reported below (above) the diagonal. All variables coded such that high scores indicate more of the construct.

### Regression Analyses on Risk-Cognitions in the MANCOVA and H<sub>1</sub>

**Absent-exempt endorsement.** To take advantage of the continuous nature of social comparison and participant risk, hierarchical multiple regression analyses were used to examine the hypothesized Risk Level by Condition interaction (Non-comparison = 0, Comparison = 1), as well as the anticipated social comparison moderation of this interaction. For all regressions that included a hypothesized 3-way interaction, the T1 cognition (if available) was entered in the first step, followed by participant risk level, condition, and social comparison orientation in the second step. The 2-way interactions were entered in the third step and the final step in the regression analysis included the anticipated 3-way interaction. For all predicted 2-way Condition by Risk-level interactions, the T1 cognition was entered in the first step of the regression analysis, the

main effects of participant risk level and condition were entered in the second step, and the final step included the anticipated 2-way interaction.

T1 absent-exempt endorsement was a significant predictor of T2 absent-exempt endorsement ( $p < .001$ ;  $R^2 = .21$ ; see Table 7). Participant risk level entered in as significant ( $p < .05$ ), with high-risk participants reporting higher levels of absent-exempt thinking, but the effect became non-significant once the interactions were entered into the equation ( $p > .5$ ). As predicted, the 3-way interaction among participant risk level, condition, and social comparison orientation was significant ( $\beta = .25$ ,  $t = 2.67$ ,  $p < .008$ ). The final model accounted for an additional 5% of the variance in T2 absent-exempt endorsement beyond T1 absent-exempt endorsement ( $R^2 = .26$ ).

**Table 7**  
**T2 Absent-exempt Endorsement**

Variable	Standardized Coefficients	t	p-value
Intercept		6.94	.000
T1 Absent-exempt Endorsement	.50	8.09	.000
Participant Risk Level	.05	0.61	.546
Condition	.09	1.35	.179
Social Comparison (SC)	.08	1.05	.295
Condition x SC	.08	1.04	.300
Participant Risk x SC	-.11	-1.23	.196
Participant Risk x Condition	.11	1.25	.211
Condition x Participant Risk x SC	.25	2.67	.008

**Note.** Final step in regression analysis. Participant risk and social comparison are continuous from low to high. Condition was coded 0=Non-comparison, 1=Comparison.

To further investigate this 3-way interaction, a median split was used to separate participants into high and low social comparison groups. It was predicted that the 2-way interaction would be stronger among high comparers ( $H_3$ ). Additional hierarchical regressions were then conducted for each of these groups. For low social comparers, the 2-way interaction was not significant ( $p > .60$ ; see Figure 7).

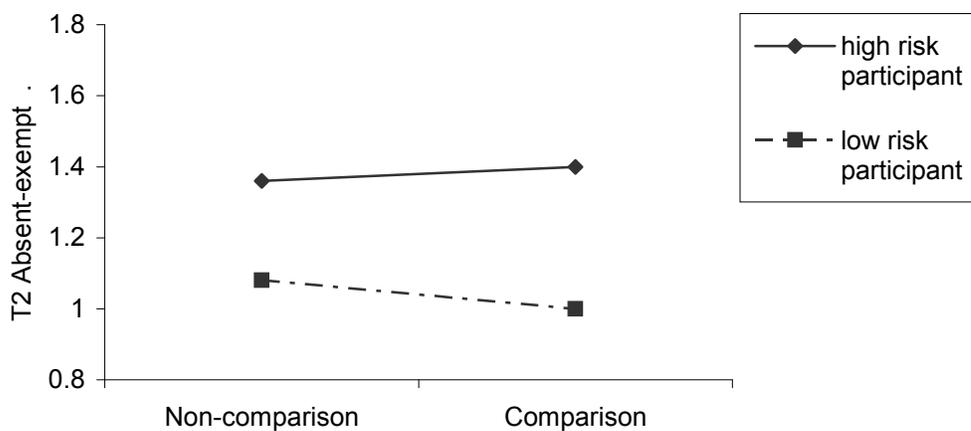


Figure 7. T2 absent-exempt endorsement controlling for T1 absent-exempt endorsement as a function of participant-risk and condition for low social comparers (*NS*).

For high social comparers, however, the risk level by condition interaction was significant ( $\beta = .26$ ,  $t = 2.17$ ,  $p = .03$ ; see Figure 8). As predicted, high-risk, high comparison participants, who compared with the lower-risk (but infected) target reported higher absent-exempt endorsement than those in the non-comparison condition. For high-social comparers, simple slopes tests revealed that condition was associated with absent-exempt endorsement only among high-risk participants ( $\beta = .30$ ,  $t = 2.57$ ,  $p = .013$ ). It is also important to note that a repeated-measures analysis revealed that this focal group (high-risk/high-comparing/comparison condition) was the only group to

significantly *increase* their absent-exempt endorsement between T1 and T2; while absent-exempt endorsement decreased for all other groups.

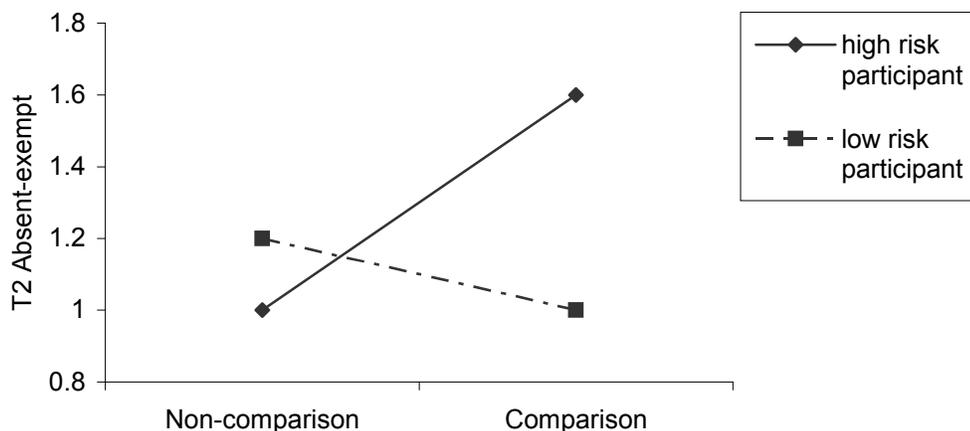


Figure 8. T2 absent-exempt endorsement controlling for T1 absent-exempt endorsement as a function of participant-risk and condition for high social comparers.

**Willingness.** Multiple regression analyses were again used to examine the hypothesized Risk Level by Condition by Social Comparison interaction on T2 willingness to have sex without a condom, controlling for T1 willingness. T1 willingness was a significant predictor of T2 willingness ( $\beta = .64, p < .001; R^2 = .56$ ; see Table 8). A significant main effect for risk level was found, such that high-risk participants reported higher levels of willingness to engage in sex without a condom ( $\beta = .26, t = 4.73, p < .001$ ). A significant main effect for social comparison orientation was also found, such that participants with a stronger tendency to compare reported more willingness ( $\beta = .11, t = 2.10, p < .05$ ). The predicted Condition by Risk Level interaction was also significant ( $\beta = .10, t = 1.94, p = .05$ ). Simple slopes tests revealed that willingness was positively and significantly associated with condition among the high-risk participants ( $\beta = .13, t = 2.01, p < .05$ ), and negatively associated with condition among low-risk

participants ( $\beta = -.13$ ,  $t = -2.04$ ,  $p < .05$ ). In addition, a marginal Social Comparison by Risk Level interaction was found, ( $\beta = -.11$ ,  $t = -1.89$ ,  $p = .06$ ). Finally, the 3-way interaction between participant risk level, condition, and social comparison orientation was also marginal ( $\beta = .11$ ,  $t = 1.78$ ,  $p = .08$ ), but in the predicted direction. This final model accounted for an additional 11% of the variance in willingness to have sex without a condom ( $R^2 = .67$ ).

**Table 8**  
**T2 Willingness**

Variable	Standardized Coefficients	t	p-value
Intercept		52.98	.000
T1 Willingness	.64	14.66	.000
Participant Risk Level	.26	4.73	.000
Condition	.02	.20	.841
Social Comparison (SC)	.11	2.10	.037
Condition x SC	-.08	-1.60	.112
Participant Risk x SC	-.11	-1.89	.06
Participant Risk x Condition	.11	1.94	.05
Condition x Participant Risk x SC	.11	1.78	.08

Note. Final step in regression analysis. Participant risk and social comparison are continuous from low to high.

Condition was coded 0=Non-comparison, 1=Comparison.

To further investigate the (marginal) 3-way interaction, the 2-way Condition by Risk Level interaction was examined separately for the low- and high-risk groups. Among both groups, there were again significant effects for both T1 willingness and risk level on T2 willingness (all  $ps < .01$ ). For low comparers, the 2-way interaction was not significant ( $p > .80$ ; see Figure 9). For high comparers, however, the Risk level by

Condition interaction was significant ( $\beta = .18, t = 2.03, p < .05$ ; see Figure 10). The pattern of the interaction on willingness is very similar to the findings with absent-exempt endorsement (even though the correlation of the two variables is only .12). Among the focal high-risk, high comparing participants, those who compared with the low-risk target reported higher levels of willingness to have sex without a condom than those in the non-comparison conditions.

For the high-social comparers, simple slopes tests revealed that willingness was positively and significantly associated with condition among high-risk participants ( $\beta = .22, t = 2.11, p < .04$ ), and negatively associated with condition among low-risk participants ( $\beta = -.18, t = -1.87, p < .07$ ). As predicted, these slopes were in opposite directions, such that high comparers in the social comparison target condition reported the highest level of willingness if they were at higher risk for contracting an STD, whereas participants similar to the comparison target, in terms of sexual behavior, reported the lowest levels of willingness.

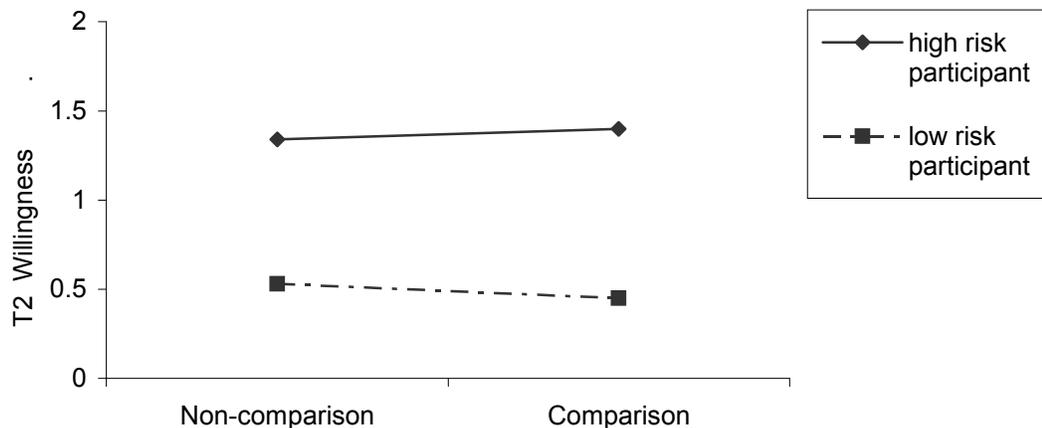


Figure 9. T2 willingness to engage in sex without a condom controlling for T1 willingness as a function of participant-risk and condition for low social comparers.

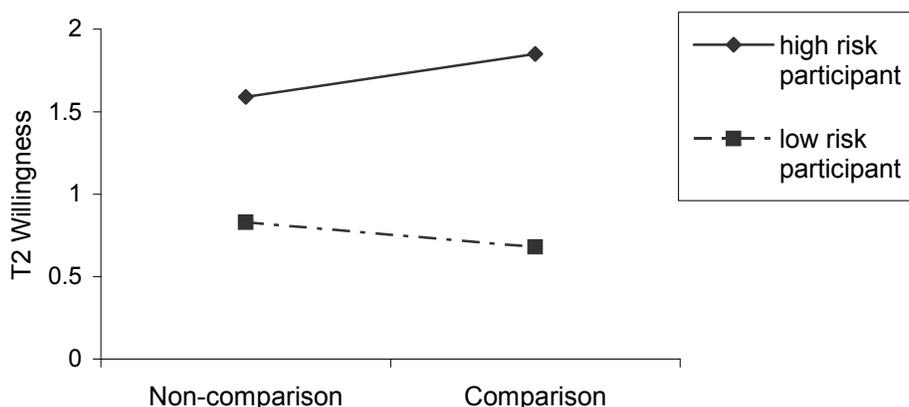


Figure 10. T2 willingness to engage in sex without a condom controlling for T1 willingness as a function of participant-risk and condition for high social comparers.

**Mediation of the Condition by Risk interaction on willingness by absent-exempt endorsement.** To determine whether the Condition by Risk Level interaction on T2 willingness to engage in risky sex among high comparers was mediated by T2 absent-exempt endorsement, controlling for T1 absent-exempt endorsement (H<sub>3</sub>), a series of hierarchical regression analyses was performed as outlined by Baron and Kenny (1986). The first analysis revealed a strong 2-way interaction on change in the mediator (i.e., T2 absent-exempt endorsement, controlling for T1 absent-exempt endorsement):  $\beta = .43, t = 3.58, p < .001$  (again reflecting the fact that absent-exempt thinking went up only for the high comparison group). In the second regression, the 2-way interaction was also a significant predictor of willingness to engage in sex without a condom ( $\beta = .18, t = 2.03, p < .05$ ). However, as can be seen in Figure 11, once change in absent-exempt endorsement was entered into the regression, the Condition by Risk Level interaction on willingness was no longer significant ( $\beta = .10, t = .91, p = .37$ ). In addition, feelings of being exempt from STDs (absent-exempt endorsement) was a strong predictor of willingness to have sex without a condom ( $\beta = .33, t = 3.44, p = .001$ ).

The indirect effect of the Condition by Risk Level interaction on willingness through changes in absent-exempt endorsement was significant, Sobel's (1982) test  $t = 2.26$ ,  $p < .03$ <sup>2</sup>. When T1 willingness (which correlated .73 with T2) was added into the regression equations, the overall pattern was the same, however, the mediation test became marginal, Sobel's test ( $t = 1.78$ ,  $p < .08$ ). Additional analyses revealed that the significant mediation is, in part, a reflection of the finding that condition was a significant predictor of absent-exempt endorsement for high-risk participants only ( $p < .01$  vs.  $p < .40$ ).

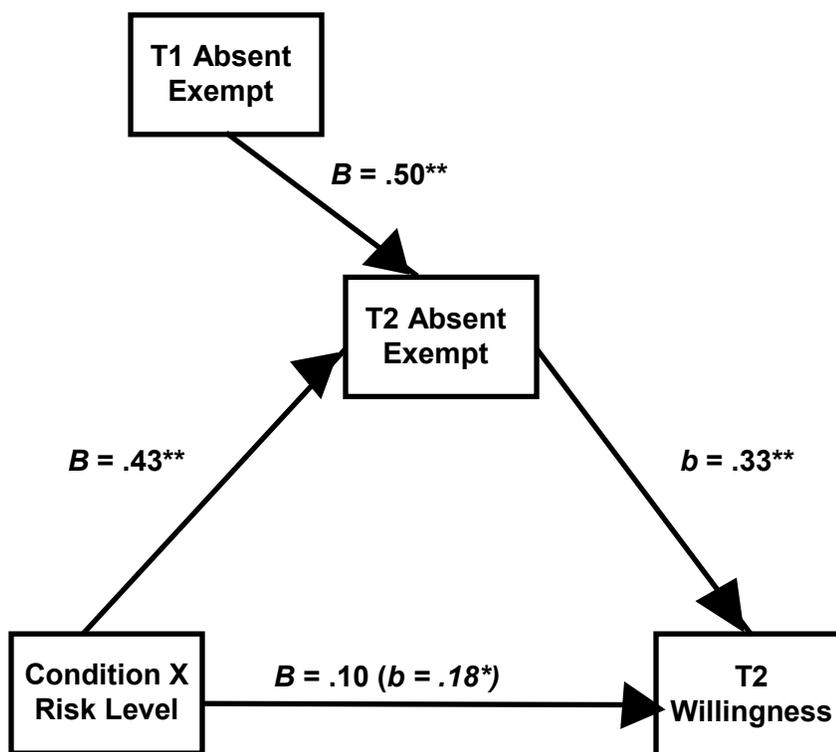


Figure 11. Regression coefficients demonstrating cognitive mediation of the effect of the Condition by Risk Level interaction on T2 willingness by T2 absent-exempt endorsement, controlling for T1 absent-exempt endorsement among high-comparers. \*  $p < .05$ , \*\*  $p < .01$ .

**Conditional perceived vulnerability.** Next, hierarchical multiple regression analyses were used to examine the hypothesized Risk Level by Condition interaction as well as the anticipated social comparison moderation of this interaction on T2 conditional perceived vulnerability, while controlling for T1 perceived vulnerability. T1 perceived vulnerability was a significant predictor of T2 vulnerability ( $p < .001$ ;  $R^2 = .22$ ; see Table 9), as was participant risk level ( $\beta = -.20$ ,  $t = -2.59$ ,  $p = .01$ ), both in the expected direction.

**Table 9**  
**T2 Perceived Vulnerability**

Variable	Standardized Coefficients	t	p-value
Intercept		15.05	.000
T1 Perceived Vulnerability	.49	8.76	.000
Participant Risk Level	-.20	-2.59	.010
Condition	-.03	-.59	.555
Social Comparison (SC)	-.06	-.81	.418
Condition x SC	.04	.54	.591
Participant Risk x SC	.21	2.63	.009
Participant Risk x Condition	-.20	-2.49	.014
Condition x Participant Risk x SC	-.16	-1.90	.06

**Note.** Final step in regression analysis. Participant risk and social comparison are continuous from low to high. Condition was coded 0=Non-comparison, 1=Comparison.

The anticipated 2-way Condition by Risk Level interaction indicated that high-risk participants in the comparison condition reported the lowest levels of vulnerability, whereas low-risk participants in this condition reported the highest levels ( $\beta = -.20$ ,  $t = -2.5$ ,  $p = .01$ ; see Figure 12). Simple slope analyses indicated that the impact of condition

on perceived vulnerability was significant for high-risk participants, ( $\beta = -.19$ ,  $t = -2.34$ ,  $p = .02$ ), but not for low-risk participants ( $\beta = .08$ ,  $t = .95$ ,  $p = .35$ ). These findings are consistent with those found on absent-exempt endorsement, with high-risk participants in the comparison condition reporting the greatest level of feeling “exempt” from future STDs. In addition, repeated-measures analyses revealed that this group was the only group that *decreased* their vulnerability estimates between T1 and T2 ( $p < .05$ ), while all other groups tended to increase their vulnerability estimates, a finding similar to that of absent-exempt endorsement (increasing only among this group). The final step in the regression model accounted for 36% of the variance in perceived vulnerability (an additional 14% after T1).

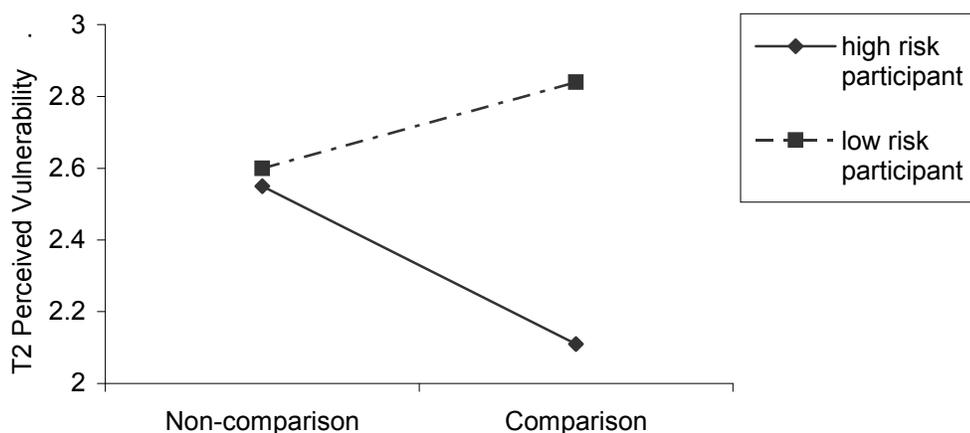


Figure 12. T2 perceived vulnerability in contracting an STD controlling for T1 perceived vulnerability as a function of risk level and condition.

A Risk Level by Social Comparison orientation interaction revealed that high-risk, low comparing participants reported the lowest levels of vulnerability ( $\beta = .21$ ,  $t = 2.63$ ,  $p < .01$ ). The predicted moderation by comparison tendencies was marginal, ( $\beta = -.16$ ,  $t = -1.9$ ,  $p = .06$ ). Upon further examination of the marginal 3-way interaction, it was found

that the 2-way Risk Level by Condition interaction was significant for high comparers, ( $\beta = -.34, t = -2.92, p < .01$ ), but not for low comparers, ( $p = .35$ ). Thus, once again it was found that the comparison condition had a stronger impact on those who engage in social comparisons more often.

**Estimated prevalence.** The predicted Risk Level by Condition interaction was significant ( $\beta = .28, t = 2.87, p < .01$ ; see Table 10). Simple slope analyses indicated that the impact of condition on estimated prevalence of sex without a condom was significant for both high-risk participants ( $\beta = .27, t = 2.98, p < .01$ ) and low-risk participants ( $\beta = -.19, t = -1.97, p = .05$ ), but in opposite directions, as predicted. The pattern was that among those in the comparison condition, high-risk participants reported the highest estimated prevalence, whereas low-risk participants reported the lowest prevalence. A Risk Level by Social Comparison orientation interaction was also revealed, ( $\beta = .20, t = 2.15, p < .04$ ). The slope was significant only for high-risk participants ( $\beta = .19, t = 1.97, p = .05$ ), such that high-risk, high-comparing participants reported the highest prevalence of students having sex without condoms, while high-risk, low comparing participants reported the lowest estimated prevalence.

A significant 3-way interaction among participant risk level, condition, and social comparison orientation was found on the participants' estimated prevalence of sex without a condom ( $\beta = -.20, t = -2.0, p < .05$ ). Additional hierarchical regressions conducted separately for the high and low comparers indicated that the 2-way interaction was not significant for low-comparers ( $p = .24$ ; see Figure 13), whereas it was significant for high social comparers ( $\beta = .33, t = 2.36, p = .02$ ; see Figure 14). A pattern similar to the previous risk-promoting cognitions was found: among high

comparing participants in the comparison condition, high-risk participants reported the highest prevalence, whereas low-risk participants reported the lowest prevalence. The prevalence slope was significant among both low and high-risk participants ( $ps < .04$ ).

**Table 10**  
**T2 Estimated Prevalence**

Variable	Standardized Coefficients	t	p-value
Intercept		31.49	.000
Participant Risk Level	.112	1.60	.110
Condition	.05	.65	.517
Social Comparison (SC)	.01	.16	.872
Condition x SC	-.06	-.71	.480
Participant Risk x SC	.20	2.15	.033
Participant Risk x Condition	.28	2.87	.005
Condition x Participant Risk x SC	-.20	-2.00	.047

Note. Final step in regression analysis.

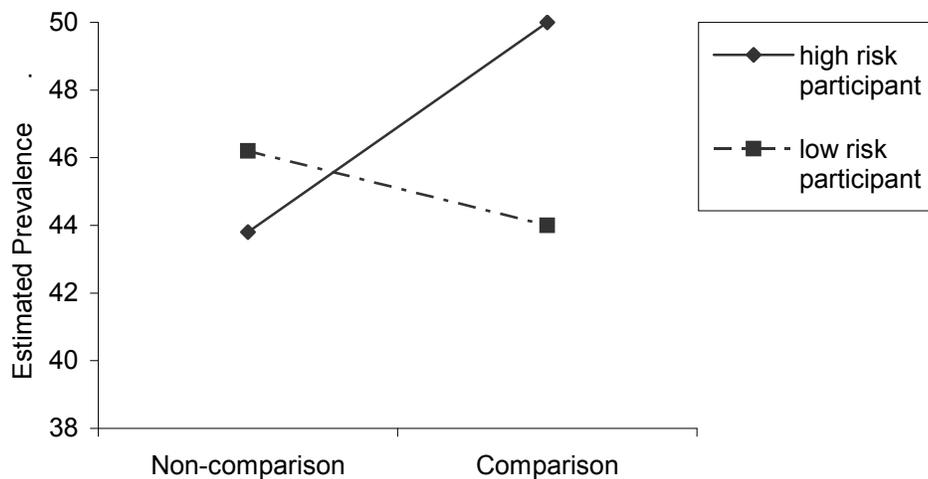


Figure 13. Estimated percentage of ISU students who have sex without a condom as a function of risk level and condition among low comparers.

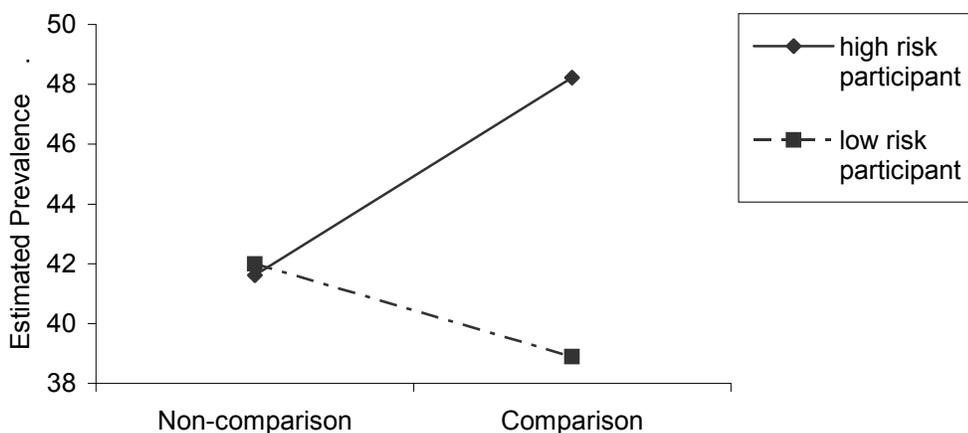


Figure 14. Estimated percentage of ISU students who have sex without a condom as a function of risk level and condition among high comparers.

**Risky sex prototype.** As expected, high-risk participants reported significantly higher levels of favorability of the risky sex prototype ( $\beta = .22, t = 2.52, p < .01$ ). The predicted Condition by Risk Level by Social Comparison interaction on the risky sex prototype was not significant ( $p > .4$ ), nor was the 2-way Condition by Risk Level interaction ( $p > .2$ ). Although the interaction was not significant, the pattern was in the predicted direction. The high-risk participants in the comparison condition tended to report the highest levels of favorability and similarity to the typical student their age who has sex without a condom. The low-risk participants in this condition had a tendency to report the lowest levels of favorability.

#### Reading Time (H<sub>4</sub>)

The anticipated Condition by Risk Level interaction on the transformed reading time on genital herpes was also significant, and followed the hypothesized pattern: low-risk participants in the social comparison condition spent the most time reading the information,

whereas high-risk participants in this condition spent the least amount of time exposed to the information ( $\beta = -.18, t = -2.05, p = .04$ ; see Figure 15). Once again, there was evidence that this high-risk group was engaging in more defensive (heuristic) processing by spending less time exposed to information on the disease. Simple slopes analyses revealed that reading time was significantly different among low and high-risk participants in the social comparison condition only ( $\beta = -.25, t = -2.1, p < .04$ ). Although not hypothesized, additional analyses revealed a marginal 3-way interaction, indicating that this pattern was marginally significant for high-comparers ( $\beta = -.26, t = -1.85, p < .07$ ) and non-significant for low-comparers ( $p = .38$ ).

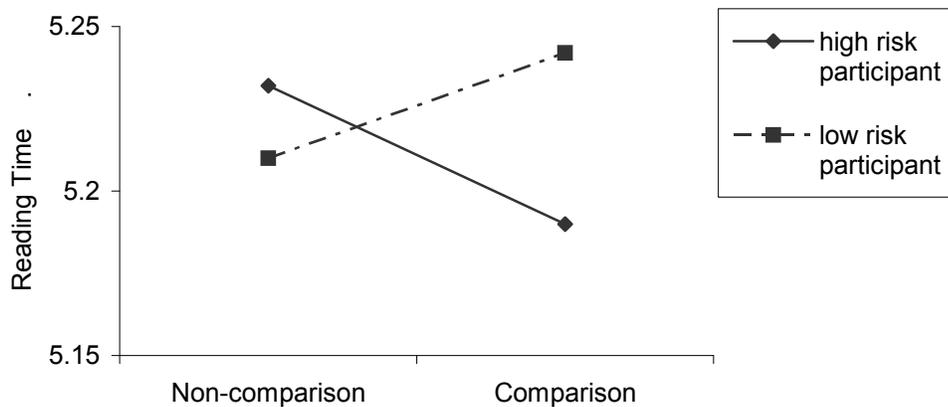


Figure 15. Time spent reading information on herpes controlling for initial reading time as a function of risk level and condition.

### STD Testing Intentions ( $H_5$ )

A significant effect was found for T1 intentions ( $\beta = .49, t = 8.48, p < .001; R^2 = .31$ ). Risk level was significant when it was entered, with high-risk participants reporting greater intentions to get tested ( $\beta = .19, t = 3.26, p = .001$ ), but was no longer significant in the final step (see Table 11). The Condition by Risk Level interaction was significant

( $\beta = .15$ ,  $t = 2.06$ ,  $p = .04$ ; see Figure 16). The overall model accounted for 35% of the variance in intentions to get tested.

**Table 11**  
**T2 STD Testing Intentions**

Variable	Standardized Coefficients	t	p-value
Intercept		8.26	.000
T1 STD Testing Intentions	.49	8.48	.000
Participant Risk Level	.10	1.39	.165
Condition	.02	.20	.841
Participant Risk x Condition	.14	2.06	.041

Note. Final step in regression analysis.

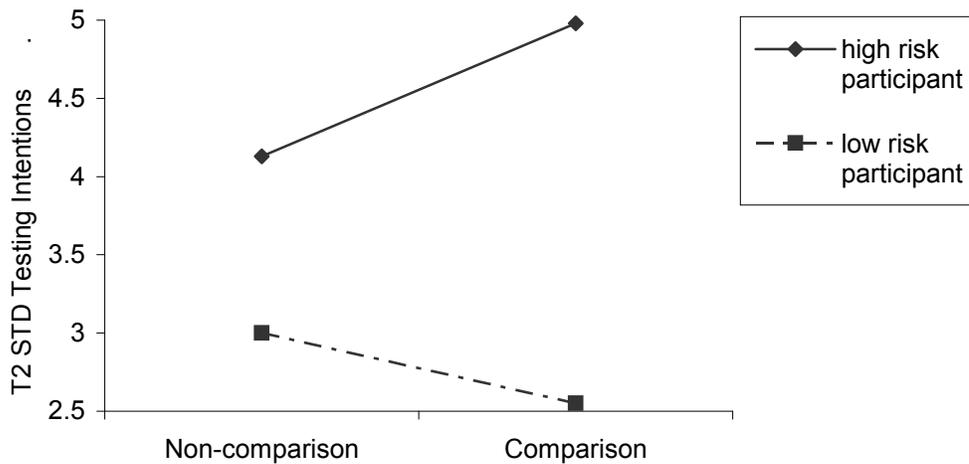


Figure 16. T2 intentions to get tested for STDs in the next 6 months controlling for T1 intentions as a function of participant-risk and condition.

Simple slopes tests revealed an interesting pattern that was markedly different than that of the other dependent variables: intentions were significantly associated with condition among both high-risk ( $\beta = .21$ ,  $t = 2.81$ ,  $p < .01$ ), and low-risk participants ( $\beta = -.22$ ,  $t = -2.65$ ,  $p < .01$ ), although in opposite directions. The low-risk participants in the

comparison condition reported the lowest level of intentions to get tested, whereas the opposite pattern was found among high-risk participants. Although high-risk participants in the comparison condition reported higher levels of the more heuristic-based risk cognitions, they reported the *greatest* intentions to get tested for STDs in the future. This supports the dual-process nature of (adolescent) decision-making.

### Negative Affect

An exploratory analysis was also conducted on negative affect, to examine if negative affect corresponded with intentions to get tested for an STD. A 2-way interaction of level of risk and condition on negative affect was examined. Although in the predicted direction, the linear regression was non-significant ( $p > .2$ ). The pattern was such that the high-risk participants in the comparison condition tended to report the highest levels of negative affect. However, it is worth noting that significant main effects for risk level and condition were revealed when a GLM ANOVA was conducted on negative affect, such that high risk participants and those in the comparison condition reported the highest levels of negative affect ( $ps < .001$ ; see Table 12). In addition, the Condition by Risk Level interaction was significant  $F(1, 219) = 7.62, p < .01$ , such that the high-risk participants in the comparison condition reported the highest levels of negative affect while the low-risk participants in the non-comparison condition reported the lowest levels of negative affect.

**Table 12: T2 Negative Affect Means by Risk Level and Condition**

Non-comparison				Comparison			
Low-risk		High-risk		Low-risk		High-risk	
<u>M</u>	<u>SE</u>	<u>M</u>	<u>SE</u>	<u>M</u>	<u>SE</u>	<u>M</u>	<u>SE</u>
1.78	.12	2.00	.10	2.26	.15	3.26	.17

Note: N = 222; SE= Standard Error.

## DISCUSSION

Although many PSAs and other media programs use personal testimonials to deliver their health message, until recently, very little research had examined the potential impact of the social comparison process that undoubtedly is promoted by this approach (Stock et al., 2007). This study was designed to explore how social comparison prompted by a health message influences health cognitions. The present study also examined the role that social comparison tendencies play in these reactions to comparison-based health information. Previous studies examining absent-exempt thinking have included both sexually- active college students and outdoor road workers. High-risk participants comparing with a lower-risk, but infected, target reported the lowest levels of perceived vulnerability and highest levels of willingness and absent-exempt endorsement (Stock et al., 2007, Studies 1-3). The high-risk student participants also spent less time reading information on herpes when faced with the low-risk target versus when they compared with another high-risk student who was infected (Stock et al., 2007, Study 3). When given information defining absent-exempt thinking via a different health behavior prior to hearing the lower-risk comparison target, however, the participants reported lower endorsement of the health-risk cognitions and spent more time reading the health information provided.

Although these studies uncovered important findings about health cognitions in general, and absent-exempt perceptions in particular, it was not clear how a peer-based social comparison message would differ from a PSA that also included the underlying message, "it only takes one time." Additionally, questions remained about how low-risk participants would respond to measures of absent-exempt endorsement and information on STDs after engaging in comparison with another low-risk, but infected peer. Finally, it

was not known if evidence of reactance among high-risk participants found on measures of willingness would disappear with measures of intentions to get tested for an STD. Thus, the current study included a control and non-comparison informational condition (PSA), additional measures of health-cognitions (estimated prevalence, intentions to get tested), and controlled for baseline measures. It was predicted that differences would be found between high- and low-risk participants in the comparison target, PSA, and control conditions. When comparing endorsement of the risk-promoting cognitions, significant differences were found between the comparison condition and both the PSA and control conditions. No significant differences were found, however, between the control and PSA conditions. Potential reasons will be discussed later. Additionally, the pattern was such that the comparison group clearly stood out from the other two. Therefore, the control and PSA conditions were combined into a non-comparison condition.

Low-risk participants, who compared with a low-risk target, but had contracted an STD, reported significantly lower-levels of the risk-promoting cognitions. Specifically, the low-risk participants in the comparison condition reported the lowest levels of absent-exempt endorsement, willingness, estimated prevalence, and the highest levels of perceived vulnerability. More interesting, however, were the results with the high-risk group. The high-risk participants in the comparison target condition reported the highest levels of absent-exempt endorsement, willingness, estimated prevalence, and the lowest levels of perceived vulnerability. These participants also spent the least amount of time reading information on genital herpes. Additionally, the impact of social comparison information on the risk-promoting cognitions among low- and high-risk participants was greater for those who were high in social comparison tendencies.

### **Risk Level and Comparison versus Non-comparison Based Information**

**Risk level.** As expected, higher-risk participants reported higher levels of absent-exempt endorsement, willingness, risky-sex prototype favorability, prevalence of risky sex, and lower levels of perceived vulnerability than did low-risk participants (i.e., Stock et al., 2007). This is consistent with research indicating that sexually experienced adolescents are more optimistic than sexually inexperienced adolescents regarding personal risk for STDs (Chapin, 2001; Cohn, Macfarlane, Yanez, & Imai, 1995). These findings are also consistent with the idea that individuals, especially those at high risk, are motivated to process health messages more defensively and heuristically (e.g., Kunda, 1990; Liberman & Chaiken, 1992). Additionally, although high-risk status was associated with riskier health cognitions, it was also associated with intentions to get tested for STDs and higher negative affect levels. These findings are consistent with the dual-processing nature of young adult decision-making, as will be discussed.

**PSA vs. Control.** The present research added to previous findings by demonstrating that the level of risk-promoting cognitions among low-risk versus high-risk participants interacted with comparison versus non-comparison informational conditions. As noted earlier, the initial predicted differences between the control and PSA conditions were not found. There are theoretical and methodological reasons, however, that may be able to explain this null effect. Public service announcements are fairly common, as is the phrase “it only takes one time,” and thus may have been discounted by the participants. Additionally, participating in a health study, in a health research lab, may be an “implicit” PSA, creating a level of social desirability among participants in the control condition.

**Risk-cognitions and non-comparison information.** Once combined into an overall non-comparison condition, high- and low-risk participants reported similar levels of risk cognitions in the non-comparison groups. Among high-risk participants, those in the non-comparison condition tended to report lower levels of the risk-promoting cognitions versus those in the comparison condition. Low-risk participants, however, in the non-comparison condition tended to report higher endorsement of risk-promoting cognitions, compared to those in the comparison condition. Thus, it may be the case that for high-risk participants, merely thinking about their risk is enough to reduce their risk-promoting cognitions. The low-risk participants, by definition, have not engaged in a lot of risky sexual behavior, however; therefore, simply thinking about their past behaviors or hearing a PSA may not have been enough to significantly impact their perceptions of risk.

It is not surprising that the comparison condition had a stronger impact than the non-comparison conditions. When included in health messages, heuristic-based comparison information has a stronger influence on health cognitions, than when analytic-based information is presented (e.g., informational pamphlets/PSA) (French et al., 2004; Gibbons et al., 2007; Klein, 1997). In fact, when asked about the personal impact of the study, participants in the comparison condition reported the study had a significantly stronger impact for them than did participants in either of the other two conditions. Additionally, as will be further discussed, absent-exempt biases are more likely to appear when social comparison is taking place, especially among those who tend to engage in comparisons more often. Thus, although both the PSA and comparison conditions were similar in content and had the underlying message “it only takes one time,” the *personal* comparison aspect in the comparison condition had a

stronger overall impact on absent-exempt thinking among high- and low-risk participants.

### **Risk-cognitions and Comparison with a Low-risk Target**

**Absent-exempt thinking and perceived vulnerability.** Consistent with the social reaction path of the prototype/willingness model (e.g., Perloff & Fetzler, 1986, Gibbons & Gerrard, 1995) and previous absent-exempt endorsement research (Stock et al., 2007) the comparison condition created a situation that enhanced absent-exempt thinking for high-risk participants, but reduced it for low-risk participants, especially if these participants were high in the tendency to socially compare. This was done by giving the participant a chance to compare on an important variable that can influence one's risk perceptions in the comparison process, i.e., past sexual behaviors. The low-risk target provided specific information that did not as easily allow the comparer to construe the target in order to enhance the target's risk vis-à-vis his or her risk.

As predicted, low-risk participants who heard from the similar low-risk STD positive target reported the largest increase in perceived vulnerability of contracting an STD and the largest decrease in endorsement of absent-exempt. This is consistent with previous studies, which have found that perceived risk is influenced by the apparent similarity of the comparison target and the participant (e.g. Thornton et al, 2002, Klein & Weinstein, 1997), and that optimistic bias declines when comparing with a specific individualized target (Alicke et al., 1995, Stock et al., 2007). For the high-risk participants, however, hearing from a dissimilar target fed into their illusions of invulnerability. Comparing with the low-risk / infected target led to an *increase* in feelings of being exempt from STDs in the future and a *decrease* in levels of vulnerability to STDs.

These high-risk participants were engaging in more heuristic-based and defensive processing and thus lowered their risk perceptions (e.g., Trumbo, 1999; 2002). Although the high-risk participants knew that having unprotected sex could result in contracting an STD, after engaging in risky sex multiple times without experiencing any negative physical consequences, they concluded that they were somehow “immune” and lowered their appraisals of their personal risk (cf., DiClemente, Crosby, & Wingood, 2002). Although it may not be completely illogical that these feelings of being “exempt” from infection are heightened after comparing with a lower-risk peer, it is alarming because low levels of vulnerability are associated with future risky behavior and low levels of future protection (e.g., Gibbons et al., 2002). These effects are especially disconcerting given that number of sexual partners and lack of condom use are the most significant factors in STD exposure (e.g., Millstein, Moscicki, & Broering, 1993).

**Estimated prevalence.** Not only did high-risk participants report the lowest levels of risk perceptions, they also reported the highest estimates of the prevalence of risky sexual behaviors on campus. This finding was not surprising, given that sexually-active adolescents have been shown to overestimate the prevalence of sexual activity among their peers more than non-sexually-active students (e.g., Gibbons Helweg-Larsen, & Gerrard, 1995). This is likely due, in part, to the availability heuristic (Tversky, & Kahneman, 1974) and the false consensus effect (Ross, Greene, & House, 1977). What is interesting is that the estimation of risky sexual behaviors in the general student population also varied as a function of condition. Once again, high-risk participants in the comparison condition reported the highest levels. These high estimates were associated with a greater willingness to have sex without a condom. Perceiving that a

majority of ones peers engage in similar risky behaviors may serve as a defensive mechanism and as a false standard which enables these students to justify their own risky sexual behavior and minimize their level of risk compared to others on campus. Low-risk participants in the comparison condition, however, reported the lowest prevalence estimates. Additionally, they reported more accurate estimates than did the high-risk participants. This is an interesting finding because among the low-risk group, estimated prevalence was associated with high perceptions of vulnerability, even though they were estimating a lower number of students engaging in the risky sexual behaviors.

**Avoidance of information.** An additional way in which the high-risk participants appeared defensively biased in their heuristic processing was in their tendency to avoid risk-relevant information. Controlling for initial reading time and consistent with previous research, high-risk participants spent less time reading information on herpes after comparing with the low-risk target versus the non-comparison condition (versus comparison with a high-risk target in Stock et al., 2007). In relation to absent-exempt thinking, if high-risk engagers believe that negative events are unlikely for them, perhaps they feel there is no need to pay attention to the information (e.g., Kos & Clarke, 2001). Additionally, this group reported the highest levels of anxiety, regret, and worry; thus, it is not surprising that they did not spend a lot of time reading information on STDs. After being told to think logically, however, high-risk participants (who also reported increased perceptions of vulnerability) spent more time reading this information (Stock et al., 2007, Study 3). This is the first study, however, to include reading time with low-risk participants. The low-risk participants in the comparison condition, who also reported feeling the most vulnerable, spent the most amount of time gaining additional information. These findings are consistent with dual-processing models, which state that

less heuristic processing is related to greater information-seeking and less avoidance of information (Johnson, 2005).

### **Dual-processing and the Prototype/Willingness Model**

**Risk images and willingness.** Although the condition by risk level interaction was not significant for the risky sex prototype, the pattern was consistent with that of the other heuristic-based measures, with the high-risk participants in the comparison condition reporting the highest levels of favorability and low-risk participants in this condition reporting the lowest levels of favorability. As expected, a favorable prototype was strongly associated with higher willingness among all participants.

The image of the comparison target with an STD is unfavorable and participants are likely motivated to avoid being associated with this social image in the future. Decreasing the favorability of a similar comparison target can reduce willingness to engage in the same behavior that could potentially lead to similar negative consequences as experienced by the comparison target. This was shown among the low-risk participants who reported less willingness to have sex without a condom after listening to the low-risk target versus in the non-comparison condition. However, messages that include a comparison target who is obviously different in their level of risk, are seen as much less relevant to the comparer (Festinger, 1954). The high-risk participants may believe that if there is not a clear relationship between number of partners and getting an STD, then why not continue their behavior? This is an example of the absent-exempt thinking process, in which one believes that if he or she has not yet experienced any negative health consequences, then perhaps he or she will not in the future. Willingness to engage in risky behaviors among the high-risk participants may have been a reflection of the biased perception of diminished personal risk due to

the comparison. Willingness was associated with higher levels of absent-exempt endorsement and lower perceived vulnerability among those in the comparison condition. In addition, among the high-risk, high-comparers, change in absent-exempt endorsement mediated the effect of condition on willingness. This mediation effect is a finding that has not been shown before, and suggests that an increase in feelings of being exempt from future STDs among already at-risk college students can lead to an increase in risky behaviors, by increasing their willingness to engage in sexual activity in risk-conducive situations. In addition, this finding provides further evidence that absent-exempt related thinking is even more evident when social comparison is involved.

**Intentions to get tested and negative affect.** According to the prototype/willingness model, intentions are characterized by at least minimal consideration of the potential (social and health) consequences, which is more typical of analytic than heuristic processing. Although the high-risk participants in the comparison group reported the highest levels of heuristic-based responding, including the highest levels of willingness to engage in the risk behavior, they also reported the greatest increase, from baseline to post-manipulation, in intentions to get tested for an STD. Thus, they may end up 'doing the right thing,' at least in some respects, in spite of their cognitive biases evident earlier in the study (e.g., Taylor et al., 2000). This finding is evidence of the dual-processing nature of adolescent decision-making and that more reasoned processing can occur in spite of a dominance of heuristic reasoning (e.g., Reyna & Farley, 2006).

Intentions to get tested were associated with higher levels of negative affect among all participants. It was the high-risk participants in the comparison condition, however, who reported the highest levels of negative affect. Thus, although those at

higher risk may be motivated to see themselves as being exempt from future STD risk, in part to reduce any negative affect or distress, they may at the same time want to take steps to control the fear by making sure they are not infected with a disease. These findings are consistent with previous research, which found that college students who had engaged in behaviors related to HIV testing expressed higher levels of negative affect and concerns about their prior behaviors after watching a film on HIV positive individuals their age (Rothman, Kelly, Weinstein, & O'Leary, 1999). It remains unclear however, what precise role negative affect plays in the future behavior of the participants. In addition, the negative affect measure came toward the end of the questionnaire after answering an intention-based question and reading the herpes information sheet. It seems likely that negative affect was a reaction to the realization that they were at-risk (due to multiple risky sexual encounters), feelings that were exacerbated by hearing about a lower-risk comparison target who had experienced a negative consequences.

### **Individual Differences in Social Comparison**

As predicted, social comparison tendencies moderated the effect of the condition by participant risk interaction on absent-exempt endorsement, willingness, estimated prevalence, and vulnerability to STDs. Specifically, participants who were more likely to engage in social comparison were more affected by the experimental manipulation that included a comparison target (i.e., they reported the highest and lowest levels of absent-exempt endorsement). In fact, the slopes for the low comparison groups suggest that high-risk sexually active young adults may be less affected by informational health messages, and especially those that are comparison-based, if they do not typically engage in social comparison. Although the process of comparison tends to be relatively automatic when faced with information about a specific target (e.g., Gilbert et al., 1995),

high comparison orientation participants have been shown to be more strongly influenced by risk images (e.g., Gibbons et al., 1998), and by comparing with targets infected with STDs (Stock et al., 2007).

The fact that absent-exempt thinking was even more pronounced when comparing with another infected student versus non-comparison information, suggests that feelings of being exempt from future harm involves some comparison of the self with dissimilar others. This is particularly problematic for those who are high risk and are prone to socially compare, as they were shown to increase their endorsement of absent-exempt. Among low-risk participants, however, a high level of comparison orientation may actually be beneficial when comparing with a low-risk target, as revealed in their low levels of absent-exempt endorsement. However, when low-risk participants were faced with a higher-risk, but infected target, perceptions of risk were not significantly increased among high comparers (Stock et al, 2007, Study 1). The finding that absent-exempt thinking, perceptions of risk, and willingness, were more affected among high-comparers appears to be a double-edged sword. Although these individuals were more positively affected (e.g., reduction in risk-cognitions) when comparing with a similar-risk infected other, they were also more likely to be negatively affected when comparing with lower-risk peers or when no comparison information is provided. Additionally, because it is common for high comparing individuals' to construe a comparison target in ways that make themselves appear more favorable (e.g., Klein & Weinstein, 1997), it is very probable that feelings of being "exempt" are endorsed quite often when they engage in biased social comparisons. The moderation of social comparison tendencies on risk-cognitions, and absent-exempt thinking in particular, is further evidence of the important role social comparison plays in responses to a comparison-based health message.

## Intervention Implications

Researchers have called for additional programs that include the personalizing of one's own risk through testimonials of those infected with an STD (e.g., Seal & Agostinelli, 1996). Programs that attempt to make the dangers of engaging in risk behaviors more vivid, by exposing students to victims of negative consequences, may result in iatrogenic effects, if they fail to account for the risk status of the participants and the impact that social comparison with a peer can have on risk-cognitions. The current research suggests that interventions would be more effective if they included messages about the social and health consequences of engaging in the behavior by having participants compare with a similar-risk other who is already suffering those consequences. Using a low-risk target who has suffered consequences was effective in increasing perceptions of risk and decreasing willingness for other low-risk individuals, but can backfire for high-risk individuals who discount the message due to their own consequence-free past. Including targets also at high-risk, but who have suffered negative consequences, has been shown to have a positive effect on reducing risk-promoting cognitions among high-risk participants (Stock et al., 2007). Thus, it may be effective for larger scale messages to include both low-risk and high-risk infected comparison targets who are similar to the audience in other aspects (e.g., age, gender).

The PSA, which included the common phrase "it only takes one time," did not differ from the control condition, and also was less effective than the comparison condition for low-risk participants. The PSA did, however, show minimal effectiveness for high-risk participants, although additional research is needed to further determine what factors could increase the effectiveness of PSAs. As demonstrated in the present study, a comparison-based intervention that includes similar-risk targets may work better

for those who engage in social comparison more often and are already at moderate risk. Additionally, comparison processes have more impact on younger, less experienced individuals (Gibbons & Buunk, 1999); thus, messages that involve a comparison component may be best suited for teens and young adults, especially in regard to risk behaviors (Krosnick & Judd, 1982; Gibbons & Gerrard, 1997).

The findings also have implications for dual-processing models of health behavior used in designing health interventions. A majority of health behavior interventions have been based on the assumption that health behavior is reasoned. The findings of the present study, along with interventions designed with a dual-processing approach (e.g., incorporating the prototype/willingness model) indicate that much of adolescents' and young adults' decision-making has heuristic and/or reactive elements (e.g., Brainerd & Reyna, 1992; Stanovich, 2004). These elements, including the absent-exempt cognitions, are malleable and easier to change than the more reasoned or planned antecedents to behavior and therefore are logical cognitive targets for interventions. This is especially true for interventions aimed at higher-risk participants who have not experienced any negative consequences despite their risky behaviors—which is likely to be the majority (e.g., Gerrard et al., 2006; Stock et al., 2007).

Researchers may come to different conclusions about the effectiveness of an intervention depending on whether heuristic or reasoned processing is activated and if measures used to assess the effectiveness are based on the reasoned or social reaction pathway. For example, although participants may indicate a greater willingness to engage in risk behaviors, they may at the same time indicate greater intentions to get tested or engage in other protection behaviors. Future research is needed that explores the differences between the two modes of processing and the developmental course of

these processes. It also suggests that prevention and intervention efforts are likely to be more successful if they take into account the dual nature of adolescents' and young adults' decision-making.

### **Limitations**

There are limitations with the current study that need to be addressed. The first is that no measures of recall were included for the herpes information sheet. Although the measure of reading time resulted in the predicted direction, it is not known how much of the information the participants actually paid attention to. Including measures that examined what the participants remembered and how much they agreed with the information in the article, could have potentially led to additional support for avoidance and defensive processing among the high-risk participants in the comparison condition.

Additionally, although in the right direction, the predicted condition by risk by comparison orientation interaction on risky sex prototype was not significant. This may be due, in part, to the fact that the behavior was fairly common and so it may have been hard for the participants to develop a clearly defined image of someone who engages in sex without a condom; further evidence of this is the fairly low reliability of the scale. Previous research has shown that images are more influential and easier to identify if the behavior is less common and seen as more negative (e.g., Gibbons & Gerrard, 1995, Blanton et al., 2001). It would have been beneficial, however, to examine any change in favorability of a prototype of an STD-infected peer. The image represented in the present study was less common and a more easily identifiable image that represented negative social and physical consequences. Previous studies have found that prototype favorability is associated with willingness, and this link is stronger for those who are more frequent social comparers (e.g., Gibbons & Gerrard, 1997). It is

likely this image would have been more affected by those in the comparison condition, and high compares, in the present study.

Finally, it is not clear how the findings of this study would generalize to other populations or to different health-behaviors (e.g., driving after drinking). College students are unique in that they are more educated and generally healthier than the non-student population. It has been shown that absent-exempt endorsement is common and can be changed among at least one non-college population: outdoor road workers (Stock et al., 2007). Additional research, however, needs to be conducted on other types of health-risk behaviors and with different at-risk populations in order to replicate the findings and discover more about the processes behind absent-exempt thinking.

### **Future Research**

**Absent-exempt endorsement versus perceived vulnerability.** Change in perceptions of vulnerability did not mediate the effect of condition on willingness, although as predicted, change in absent-exempt endorsement did. It has been suggested that absent-exempt endorsement is more strongly linked to the use of past experiences to predict future consequences, than is perceived vulnerability (Weinstein, 1982). The present study, in addition to previous research, suggests that absent-exempt thinking is related to, but distinct from perceptions of vulnerability (Stock et al., 2007). For example, among outdoor road workers, absent-exempt endorsement was a stronger predictor of sun protection over time, indicating that it may be beneficial to include absent-exempt thinking measures as predictors of future behavior. The present study indicated that absent-exempt thinking was more strongly influenced by the comparison process, but in a similar fashion to vulnerability. Until now, very few studies have included measures of both absent-exempt endorsement and perceptions of vulnerability.

Future research needs to further examine how perceptions of vulnerability and absent-exempt thinking influence each other and how they are differentially influenced by other psychological and environmental variables.

**Additional cognitive mediators.** There are additional cognitive factors that may play a role in the differences found in the present study. For example, the degree of control or self-efficacy a participant feels they have in their sexual practices may alter the meaning and significance of the comparison process. Previous research has shown that biases in risk perceptions are increased when an individual feels he or she has more control over the risk behavior and the potential outcomes associated with it (e.g., Kos & Clark, 2001; Weinstein, 1982). Therefore, it would be interesting to examine the relation between absent-exempt endorsement and feelings of controllability. As mentioned earlier, future research is also needed to more closely examine the role negative affect and other measures of affect play in absent-exempt thinking.

**Self-esteem.** Self-esteem is another construct that has potential implications for the effects found in the study. Researchers have found that low self-esteem individuals responded appropriately when faced with information about the riskiness of their behaviors, whereas high self-esteem individuals avoided the implications of the unwanted information (Gibbons, Eggleston, & Benthin, 1997; Smith, Gerrard, Gibbons, 1997). In fact, high self-esteem (versus low self-esteem), high-risk students engaged in reactance after comparing with the lower-risk target by increasing their willingness (Gibbons et al., 2007). Future research will investigate the role self-esteem plays in absent-exempt thinking, how it relates to individual differences in the tendency to compare, and whether endorsement of absent-exempt can be reduced among high-risk engagers through self-affirmation processes (e.g., Sherman, Nelson, & Steele, 2000).

**Prospective research.** The findings of this study point to a need for longitudinal research on the effectiveness of messages and the impact of change in absent-exempt thinking over time, with sexual behaviors as the primary dependent variable. Our results suggest that instead of changing behavior, comparison with a dissimilar, but infected target, may lead high-risk, high-comparing, individuals to defensively process messages. This could potentially lead to an increase in risk behaviors. It is not known how long the reactance effect found among high-risk participants in the comparison condition will last. Based on the results with the less heuristic-based measures (intention to get tested), however, it is possible these effects will not be long-lasting. Additionally, it would be beneficial to know if the encouraging results found in this study (i.e., lowering of absent-exempt endorsement and willingness) will be more long-lasting. In addition, it remains unclear why many individuals endorse the notion of absent-exempt thinking (e.g., why they think they are immune). Thus, it would be useful to investigate absent-exempt thinking over time, along with additional potential mediators and moderators, and new risk behaviors and populations.

**Social comparison process.** Finally, although social comparison researchers are beginning to more fully understand the important role the process of social comparison plays in the perception of health risks, it is likely that the daily impact of peer-based health information among high comparers has been downplayed. Participants who heard the comparison-based message reported that the study had a stronger impact versus those in the non-comparison conditions. Previous research has shown that the comparison process has important implications for peer-based messages and can potentially reduce perceptions of risks among those most at-risk for negative consequences (Stock et al., 2007). Additional research is needed to fully

explore the relation between absent-exempt thinking, comparison with others, coping with a health threat, and individual differences in the tendency to compare. This research should also include additional affective and cognitive mediators (e.g., Buunk & Gibbons, 2007). Thus far, very little research has been conducted on the process of absent-exempt thinking and there is a wealth of information that still remains to be discovered.

### **Conclusion**

In conclusion, this study highlights the importance of social comparison in both the development of absent-exempt thinking and in reactions to health messages, especially those that are peer-based. Health messages that include a comparison target to demonstrate only a few risk encounters can lead to negative consequences, in order to increase risk perceptions, undoubtedly prompt the process of comparison, and can lead to the opposite effects among the group it was designed to impact the most, those at higher-risk. This is especially true if audience members are prone to engage in social comparison, as many young adults are. If the target audience consists of low-risk engagers, however, this message can have a positive impact on risk-promoting cognitions. This study demonstrates the need to consider the risk status of both the audience and potential comparison targets employed in preventive health messages, and suggests that high social comparers and those who are at a greater risk may be more affected by comparison targets than are others.

**FOOTNOTES**

1. The regression analyses outlined in the hypotheses conducted on the risk-promoting cognitions did not produce significant differences for males versus females. Thus, all analyses included all participants.
2. The mediation effect was hypothesized to be significant among high comparers. Due to the non-significant findings of the 2-way interaction among low-comparers on willingness and absent-exempt endorsement, the mediation test was not logical among these participants. When the mediation test was conducted on all participants, however, the Sobel test was marginal ( $t = 1.68, p < .10$ ).

**APPENDIX A**  
Health Attitudes Questionnaire

Please answer the following questions. Please read each question and each choice carefully. You are free to skip any questions that you do not feel comfortable answering and you are free to stop at any time.

The following questions will be asked at pre-testing and post-manipulation.

Behavioral Willingness

*Assume you are not involved in a steady or serious dating relationship. Now suppose you're at a party and you start talking to a guy with whom you have enjoyed hanging out with a few times before. You think that he is very attractive and you are enjoying spending time with him. At the end of the evening, you're feeling as if you might like to be alone with him/her and you are certain that he feels the same way. Neither of you has a condom or other contraceptive method with you. He invites you back to his apartment.*

In this situation, how willing would you be to do each of the following?

1. Go to their apartment, make-out and have sex using a method like withdrawal (i.e. withdrawing the man's penis before ejaculation).

A	B	C	D	E	F	G
Not at all willing			Maybe			Very willing

2. Go to his/her apartment, make-out and have sex without a condom.

A	B	C	D	E	F	G
Not at all willing			Maybe			Very willing

3. Tell him/her you've had a good time, but go home alone.

A	B	C	D	E	F	G
Not at all willing			Maybe			Very willing

*Suppose you were out on a date with your boyfriend and you both want to have sexual intercourse. Neither of you has a condom or other contraceptive method with you. Under these circumstances, how willing would you be to do each of the following?*

4. Go ahead but use a method like withdrawing the man's penis before ejaculation.

A	B	C	D	E	F	G
Not at all willing			Maybe			Very willing

5. Go ahead and have sexual intercourse anyway without a condom or other contraceptive method.

A	B	C	D	E	F	G
Not at all willing			Maybe			Very willing

6. Not have sex.

A	B	C	D	E	F	G
Not at all willing			Maybe			Very willing

#### Absent-Exempt Thinking

7. If I haven't gotten an STD by now, I probably won't get one in the future.

A	B	C	D	E	F	G
strongly disagree						strongly agree

8. If I haven't gotten an STD by now, I probably won't in the future because I have good choice in sexual partners.

A	B	C	D	E	F	G
Strongly Disagree						Strongly Agree

9. If I haven't gotten an STD by now, I probably won't in the future because I am lucky.

A	B	C	D	E	F	G
Strongly Disagree						Strongly Agree

10. If I haven't gotten an STD by now, I probably will not in the future even if I don't always use protection.

A	B	C	D	E	F	G
Strongly Disagree						Strongly Agree

Perceived Vulnerability

11. If you were to have *sexual intercourse without a condom*, what do you think the chances are that you would contract an STD?

A	B	C	D	E	F	G
not at all likely						very likely

12. If you were to have *sexual intercourse without a condom with a casual partner* (someone you're not exclusively dating or recently met), what do you think the chances are that you would contract an STD?

A	B	C	D	E	F	G
not at all likely						very likely

13. If a typical ISU student your age and gender were to have *sexual intercourse with a casual partner without a condom*, what do you think the chances are that they would contract an STD?

A	B	C	D	E	F	G
not at all likely						very likely

14. In general, how dangerous (health-wise) do you think having *sexual intercourse with a casual partner without a condom* is?

A	B	C	D	E	F	G
not at all dangerous						very dangerous

15. If you were to have *sexual intercourse without a condom with a steady partner*, what do you think the chances are that you would contract an STD?

A	B	C	D	E	F	G
not at all likely						very likely

16. If a typical ISU student your age and gender were to have *sexual intercourse with a steady partner without a condom*, what do you think the chances are that they would contract an STD?

A	B	C	D	E	F	G
not at all likely						very likely

17. In general, how dangerous (health-wise) do you think having *sexual intercourse* with a *steady partner without a condom* is?

A	B	C	D	E	F	G
not at all dangerous						very dangerous

18. How likely is it that you will get tested for an STD within the next 6 months?

A	B	C	D	E	F	G
not at all likely						very likely

### Prototypes

Now we'd like you to think about the type of person your age and sex who has sex *without a condom*. We are not suggesting that these people are always alike. Rather, we are interested in what traits you think this person is likely to have (that is, what most people in this group are like). How much do you think each of the following words describe your image of that type of person? Please use the following scale:

A	B	C	D	E	F	G
Not at all						Extremely

19. Smart  
20. Popular  
21. Immature  
22. Careless  
23. Self-confident  
24. Unattractive

25. How similar do you think you are to the typical person your age and gender who has sex without a condom?

A	B	C	D	E	F	G
Not at all Similar						Very Similar

Now we'd like you to think about the type of person your age and sex who has *casual sex without a condom*. We are not suggesting that these people are always alike. Rather, we are interested in what traits you think this person is likely to have (that is, what most people in this group are like). How much do you think each of the following words describe your image of that type of person? Please use the following scale:

A	B	C	D	E	F	G
Not at all						Extremely

26. Smart  
27. Popular  
28. Immature  
29. Careless

30. Self-confident

31. Unattractive

32. How similar do you think you are to the typical person your age and gender who has casual sex without a condom?

A	B	C	D	E	F	G
Not at all						Very
Similar						Similar

The following questions were asked post-manipulation only

*For the following items, please answer using a scale from 0% (none) to 100% (all).*

33. What percent of the time do you think the typical ISU student does *not* use a condom when engaging in sex? \_\_\_\_\_

34. What percent of the ISU student population do you think engages in *casual sex without a condom*? \_\_\_\_\_

35. What percent of ISU students do you think will be infected with an STD at some point in their future? \_\_\_\_\_

Note: The following will be asked prior to reading the herpes information sheet:

36. Please indicate how you feel at this moment on the following items using the following scale:

A	B	C	D	E	F	G
Not at all						Very

1) Regretful

2) Upset

3) Anxious

4) Worried

*SC Tape Only:*

1. Please indicate how many sexual partners the student on the tape mentioned she has had.

1      2      3      4      5      unsure

2. How often did she use a condom with her partner(s)?

A                      B                      C                      D                      E                      F                      G  
None of                      About                      All the  
the time                      50%                      time

3. How much do you think you would like the student on the audiotape if you met her?

1                      2                      3                      4                      5                      6                      7  
not at all                      very much

4. In your opinion, how similar are you to the student on the audiotape in terms of sexual history?

1                      2                      3                      4                      5                      6                      7  
not at all                      extremely  
similar

5. In your opinion, how risky were the sexual behaviors of the student on the audiotape?

1                      2                      3                      4                      5                      6                      7  
not at all                      very

## **APPENDIX B**

### **Informed Consent**

#### **INFORMED CONSENT DOCUMENT**

Title of Study: Health Information, Attitudes, and Behaviors  
Investigators: Michelle Stock, M. S., Meg Gerrard, Ph.D., Rick Gibbons, Ph.D.

This is a research study. Please take your time in deciding if you would like to participate. Please feel free to ask questions at any time. You must be 18 years of age or older to participate in this study.

#### **INTRODUCTION**

The purpose of this study is to examine the knowledge and attitudes of college students regarding health behaviors, including sexual behaviors. You are being invited to participate in this study because of your participation in mass testing or scale validation earlier in the semester.

#### **DESCRIPTION OF PROCEDURES**

If you agree to participate in this study, your participation will last 50 minutes or less. During the study you may expect the following study procedures to be followed. You may receive health-related information. You may be asked to listen to an audio-tape that includes health-related information. You will be asked to read some information regarding health behaviors. You will be asked to fill out a questionnaire in regards to your attitudes and health behaviors. You may skip any question that you do not wish to answer or that makes you feel uncomfortable.

#### **RISKS**

While participating in this study you may experience the following risks: mild discomfort in answering information about your health behaviors. There are no additional risks for participating in this study.

#### **BENEFITS**

If you decide to participate in this study there will be no direct benefit to you. It is hoped that the information gained in this study will benefit society by contributing new information to the existing body of literature.

#### **COSTS AND COMPENSATION**

You will not have any costs from participating in this study. You will receive one research participation credit in fulfillment of psychology course requirements for participating in this study. As noted on your course syllabus, participation in experiments is one of the available options for acquiring experimental credit in your psychology course. Alternatives include participating in other research or completing a writing assignment.

#### **PARTICIPANT RIGHTS**

Your participation in this study is completely voluntary and you may refuse to participate or leave the study at any time. If you decide to not participate in the study or leave the study early, it will not result in any penalty or loss of benefits to which you are otherwise entitled.

CONFIDENTIALITY

Records identifying participants will be kept confidential to the extent permitted by applicable laws and regulations and will not be made publicly available. However, federal government regulatory agencies and the Institutional Review Board (a committee that reviews and approves human subject research studies) may inspect and/or copy your records for quality assurance and data analysis. These records may contain private information.

To ensure confidentiality to the extent permitted by law, the following measures will be taken: Participants will be assigned ID numbers so that their names will not appear on data. Data will be stored on a password protected computer in a locked office. Only investigators and research assistants will have access to the data. If the results are published, your identity will remain confidential.

QUESTIONS OR PROBLEMS

You are encouraged to ask questions at any time during this study. For further information about the study contact Michelle Stock at 294-3260 or Dr. Meg Gerrard at 294-2119. If you have any questions about the rights of research subjects or research-related injury, please contact Janice Canny, IRB Administrator, Research Assurances, 1138 Pearson Hall, 515-294-4566 (jcs1959@iastate.edu), or Diane Ament, Director, Research Assurances, 1138 Pearson Hall, 515-294-3115, (dament@iastate.edu).

\*\*\*\*\*

PARTICIPANT SIGNATURE

Your signature indicates that you voluntarily agree to participate in this study, that the study has been explained to you, that you have been given the time to read the document and that your questions have been satisfactorily answered. You will receive a copy of the signed and dated written informed consent prior to your participation in the study.

Subject's Name (printed) \_\_\_\_\_

\_\_\_\_\_  
(Subject's Signature)

\_\_\_\_\_  
(Date)

INVESTIGATOR STATEMENT

I certify that the participant has been given adequate time to read and learn about the study and all of their questions have been answered. It is my opinion that the participant understands the purpose, risks, benefits and the procedures that will be followed in this study and has voluntarily agreed to participate.

\_\_\_\_\_  
(Signature of Person Obtaining  
Informed Consent)

\_\_\_\_\_  
(Date)



**APPENDIX C**  
Sexual History Questionnaire

1) How many people have you had sexual intercourse with (total in your lifetime)?

\_\_\_\_\_

a) How many of these were *steady* partners (a serious and committed dating partner)? \_\_\_\_\_

b) How often have you used a condom in these *steady* relationships?

1	2	3	4	5	6	7
never			about half the time			all of the time

c) How many of these were *casual* partners (not a serious or steady dating partner)? \_\_\_\_\_

d) How often have you used a condom in these *casual* relationships?

1	2	3	4	5	6	7
never			about half the time			all of the time

**APPENDIX D**  
SC Target Audiotape Script

So, I guess I'm supposed to read off and answer some questions on this sheet I was given. The first question asks me to tell a little bit about myself. I guess I am what you would call a typical ISU student. I'm a sophomore in LAS and I grew up in Iowa. I like to spend time with my friends, I play some sports and I listen to a wide variety of music I really don't know what else to say, so I guess I'll move on to the next question. *Okay, it says to describe my sexual experiences.* Well, (pause, awkward tone) I've had one partner who I knew for quite awhile before we decided to have sex. We used a condom most of the time, but not always. Okay, the next question gets into why I am here at the Health Center. Well, I was diagnosed with herpes simplex virus 2 a few months ago. I guess this is usually called genital herpes. I couldn't believe it when I found out I actually had genital herpes. I guess I never thought I'd actually get an STD. I've had lots of emotions in dealing with this, although I don't think I've been dealing with it very well. I'm scared about future relationships. I don't really know how I'd bring it up with someone that I may want to get close to in the future. Umm, I feel betrayed because I thought I could trust the person I was with, even though I know she didn't know she had the disease. I think it will be hard for me to talk about this with a girl I would like to hook up with in the future. Even if she cares about me, it still may be hard for her to understand and accept it. I really don't know who to talk to, I can't really talk to my friends, because I'm embarrassed and I don't think they'd understand. I feel as though I am now kind of different from them and I am nervous about people finding out I have herpes. Anyway, I know there are others like me on this campus with an STD, but I still feel kind of alone in dealing with this. Overall, I guess I have been feeling somewhat depressed about the situation.

**APPENDIX E**  
PSA Audiotape Script

My name is Barb (Brett) Wilkie and I am bringing you this message on behalf of the Student Health Center.

Anybody who is sexually active can be at risk for sexually transmitted diseases. The group with the highest infection rates for STDs are those college-aged.

One of the biggest misconceptions is that most of those infected with STDs have had multiple partners. However, (pause) it only takes sexual contact with one person, one time, to get an STD.

One of the more common sexually transmitted diseases among college students is genital herpes. Many students affected by it may give it to others because they do not know they are infected. The potential absence of symptoms for some STDs, is another reason to use a condom every time you have sex, even if you are with someone you have known for a long time. (Pause) It just takes one time.

Having genital herpes may cause emotional distress and can potentially have a negative impact on relationships, self-confidence, and emotional well-being. For many young adults, telling a new partner that you have genital herpes can be a difficult situation. Students may not know how to bring up the topic with future partners and they wonder how this news will be received.

Some students are nervous about others finding out they have herpes and what type of reactions they may get. Many feel somewhat alone and feel embarrassed about bringing it up with friends. They may also be somewhat depressed by the situation. However, the students are reminded that they are not alone and there are other students, even on their campus, who are dealing with the same thing.

## APPENDIX F

### Herpes Information Sheet

Genital herpes is a common STD. During the past 20 years, the number of Americans with genital herpes infection has increased 30%. The largest increase is occurring in young white teens and young adults. The infection is caused by the herpes simplex virus (HSV). There are two types of HSV, and both can cause genital herpes. HSV type 1 is the most prevalent and commonly causes sores on the lips (cold sores), but it can cause genital infections as well. HSV type 2 most often causes genital sores, but can also affect the mouth.

Genital herpes infection usually is acquired by sexual contact with someone who unknowingly is having an asymptomatic (no-symptoms present) outbreak or by a person who is infected with HSV and has noticeable symptoms. Herpes infections can be transmitted during close oral, anal, or oral-genital contact, including intercourse, kissing, or any direct skin-to-skin contact that allows for the transfer of body fluids.

One-third of individuals in the United States with genital herpes are unaware of their disease because they may not develop symptoms, it may take awhile for their symptoms to occur, or they may not recognize their symptoms. When symptoms do occur, they vary widely from person to person. If symptoms do occur, they may include painful sores, fever, muscle aches, painful urination, and swollen glands. An uninfected individual has about a 75% chance of contracting herpes during intimate contact with someone who has the herpes virus, even if that person has no symptoms. Even if an infected person never has noticeable symptoms, it is still possible for them to infect another person who may in turn get noticeable symptoms. Genital herpes can cause recurrent painful genital sores in many adults, and herpes infection can be severe in people with suppressed immune systems. Regardless of severity of symptoms, genital herpes frequently causes psychological distress in people who know they are infected.

Genital herpes increases the risk of acquiring HIV, the virus that causes AIDS, by providing an accessible point of entry for HIV. The herpes virus can also be transmitted to offspring; babies can die if they become seriously infected.

The most accurate method of testing for herpes is a viral culture of sores that may appear. For those who do not have noticeable symptoms, a blood test can detect antibodies to the virus, which indicate that the person has been infected with HSV at some time. New blood tests have been developed that can indicate if the person has the type 1 or the type 2 infection, although the results are not always clear-cut.

Currently, there is no treatment to cure herpes. There are however, medications available to help speed along the healing process when outbreaks occur. In addition, daily suppressive therapy for symptomatic herpes can help reduce transmission to partners. The surest way to avoid transmission of sexually transmitted diseases, including genital herpes, is to abstain from sexual contact, or to use protection.

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