

The Effects of Information About AIDS Risk and Self-Efficacy on Women's Intentions to Engage in AIDS Preventive Behavior¹

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Female college students' perceived vulnerability to AIDS and their perceived self-efficacy regarding AIDS preventive behavior (APB), were manipulated in a 2 × 2 design. Consistent with protection motivation theory (e.g., Rogers, 1983), the results showed that intention to engage in APB was highest among subjects who received information that their risk of getting infected with HIV was high, and who experienced relatively high feelings of self-efficacy. These subjects also seemed least likely to engage in denial of their AIDS risk. The implications of these findings for AIDS education programs are discussed.

The AIDS epidemic has now persisted unabated for over a decade. It is estimated that as many as 30,000,000 people worldwide are infected with HIV, with 1,000,000 of them living in the United States (Chin & Mann, 1989; World Health Organization, 1998). Over 270,000 people have died of AIDS in the United States alone (Centers for Disease Control, 1995). While in the early years of the AIDS epidemic, the groups believed to be most at risk were gay men, hemophiliacs, and injection drug users, epidemiological data suggest that HIV has made substantial inroads into other populations as well (Centers for Disease Control, 1993).

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One population which is increasingly at risk for HIV is sexually active young women, who now have the fastest growing rate of HIV infection (Ickovics & Rodin, 1992; World Health Organization, 1992). Moreover, about 20% of all HIV infections have occurred in individuals in their 20s, and, given the incubation period of this virus, many of these individuals were probably infected as adolescents. Young women may face a high risk for becoming HIV-infected, since they often cannot engage in AIDS-preventive behavior (APB) without negotiating with a potentially unwilling sexual partner (cf. Gerrard & Warner, 1994). Additionally, traditional gender roles and structural factors that may compel many women to rely on men for economic support may put women at a disadvantage in such negotiations (DuGuerny & Sjoberg, 1993). Clearly, an urgent need exists for research to help design effective, population-specific AIDS-risk behavior-change intervention programs for women (Fisher & Fisher, 1992). To this end, in this research the impact of two factors central to health behavior change according to protection motivation theory (Rippetoe & Rogers, 1987; Rogers, 1983), namely perceived vulnerability to HIV infection and self-efficacy regarding APB, are examined in terms of their effects on women's intention to engage in AIDS-risk behavior change.

Numerous studies have examined the relationship between perceived vulnerability to HIV and aspects of AIDS-risk behavior (see Fisher & Fisher, 1992; Gerrard, Gibbons, & Bushman, 1996, for reviews). With regard to this body of research, two difficulties can be recognized. A first problem in past research in this domain regards the causal interpretation of effects of perceived vulnerability to HIV. Most past research on perceptions of vulnerability and AIDS-risk behavior is correlational, and does not permit causal inferences. To avoid this pitfall, the present study will be conducted using an experimental design. This way, a clearer picture of the causal relationship between perceived vulnerability and women's intention to engage in APB can be reported (Weinstein & Nicolich, 1993).

A second problem with regard to research on vulnerability to HIV infection involves the inconsistency in findings (for a review, see Gerrard et al., 1996). Research suggests that people are generally inclined to engage in preventive behavior when they feel vulnerable to a health threat (Becker, 1974). This motivational effect of risk perceptions has been recognized in several health behavior models, such as protection motivation theory (Rogers, 1983) and the health belief model (Janz & Becker, 1984). In several studies, a positive relationship was found between AIDS-risk perceptions and protective behavior (e.g., Fisher & Misovich, 1990; Gielen, Faden, O'Campo, & Kass, 1994; Moatti, Bajos, Durbec, & Menard, 1991). However, other studies have not confirmed this relationship (e.g., Gerrard & Warner, 1994; Leigh, Morrison, Trocki, & Temple, 1994). It has been suggested that perceived

vulnerability predicts self-protective behavior only if the behavior in question is simple and the health threat is not very serious (Montgomery et al., 1989).

There is general agreement that protecting oneself from HIV often requires complex behavioral skills (Fisher & Fisher, 1992; Gerrard et al., 1996) and self-efficacy regarding the practice of these skills (Bandura, 1989, 1994). *Self-efficacy* has been defined as people's beliefs that they can exert control over their motivation, their behavior, and their social environment (Bandura, 1989) and is thought to be a critical prerequisite to their actually engaging in APB (Bandura, 1989, 1994). The significance of self-efficacy in APB has been shown by several authors and in different populations (e.g., Fisher & Fisher, 1992; Kelly, St. Lawrence, Hood, & Brasfield, 1989; Wulfert & Wan, 1993).

With respect to AIDS issues, Rogers' (1983) protection motivation theory addresses the relationship between perceived AIDS risk and self-efficacy regarding intentions to practice APB. In protection motivation theory, perceived vulnerability is one of the factors determining people's intentions to engage in protective behavior when confronted with a health threat. However, in this well-researched model (e.g., Bakker, Buunk, & Siero, 1993; Weinstein, 1993), risk perceptions alone are not sufficient to predict people's intentions to engage in self-protective behavior. Individuals must also believe that they can actually perform the recommended behavior (Rippetoe & Rogers, 1987). In effect, protection motivation theory holds that feeling vulnerable to HIV affects intentions to engage in APB only if people experience a high sense of self-efficacy. Thus, it is proposed that self-efficacy regarding APB will have a moderator effect: High perceptions of vulnerability to HIV will only lead people to engage in APB if, at the same time, they have a high sense of self-efficacy regarding APB. Failure to consider the role of self-efficacy could explain why some researchers, who focused solely on risk perceptions and ignored the role of self-efficacy, found no relationship or a negative correlation between perceived vulnerability to HIV and APB (for a review, see Gerrard et al., 1996).

According to protection motivation theory, if people are confronted with a message containing information that makes them feel that they are at risk for HIV, they will try to cope with their high risk in one of two ways (Rogers, 1983). If the risk message also contains information resulting in a perception of high self-efficacy to engage in APB, individuals will be likely to react to their perceived vulnerability through plans to use the skills they possess to protect themselves (i.e., they will express the behavioral intention to engage in effective preventive behavior). However, if the message leads individuals to believe that they are highly vulnerable to HIV, but does not lead them to believe that they possess self-efficacy to engage in APB, a different response is likely to occur. Such individuals will not be able to cope effectively with their perceived high risk for HIV infection and will be likely to engage in maladaptive coping

strategies instead (e.g., denial of HIV risk; Morris & Swann, 1997). In effect, if people learn that they have a high risk of becoming infected with HIV but do not feel they have the means to engage in APB, they will be motivated to deny their vulnerability. Thus, information that makes people feel vulnerable to HIV can lead them to process that information in a defensive manner (Brouwers & Sorrentino, 1993). For example, when applying protection motivation theory to breast cancer, which women generally feel little ability to prevent, Rippetoe and Rogers (1987) found that avoidance, wishful thinking, and hopelessness were among the coping styles female students adopted when confronted with this health threat. Similarly, situations in which individuals do not feel capable of reducing their AIDS risk in an effective manner can lead to a failure to remember the risk-inducing message (Morris & Swann, 1997).

In the present study, we predict that, compared to the other combinations of perceived vulnerability and self-efficacy, people will intend most strongly to engage in APB if they feel vulnerable to HIV and at the same time have a relatively high sense of self-efficacy regarding the performance of APB. To help interpret results, the extent to which individuals deny possible HIV risk will be assessed and analyzed from an exploratory basis.

Method

Participants and Design

Participants were female University of Connecticut undergraduate students enrolled in Introductory Psychology. A total of 88 women volunteered to take part in the study. Their mean age was 19 years, and ages ranged from 17 to 23. In our sample, 69 women were sexually active. Since in our sample dependent variables did not covary with sexual experience, this factor was not included in our analyses. The sample of participants was 87% ($n = 76$) White, 7% ($n = 6$) African American, 2% ($n = 2$) Asian, and 4% ($n = 4$) Hispanic. Controlling for ethnic background did not affect our results significantly, therefore this factor will not be mentioned further. Participants were recruited from the Psychology Department subject pool and received credit toward a course requirement. The experiment was conducted using a 2×2 (Vulnerability: Normal vs. Increased \times Self-Efficacy: Normal vs. Increased) between-subjects factorial design. Participants were randomly assigned to one of the four resulting conditions. Participants did not differ by condition in their likelihood of being tested for HIV, $\chi^2(3, N = 88) = 0.60, ns$, or in having ever engaged in sexual intercourse, $\chi^2(3, N = 88) = 1.16, ns$. Of the participants who reported ever having had sexual intercourse, participants did not differ by condition in their likelihood of using condoms with their current

sexual partner, $\chi^2(3, N = 69) = 1.67, ns$; ever having discussed condom use with a sexual partner, $\chi^2(9, N = 69) = 3.56, ns$; or having used condoms consistently in past sexual encounters, $\chi^2(3, N = 69) = 3.63, ns$. The normal-vulnerability/normal-self-efficacy condition functioned as a control condition, since it reflected individuals' untreated states of perceived vulnerability and self-efficacy. Previous research has revealed that young women's perceptions of vulnerability to HIV are already low (Gerrard & Warner, 1994). Because the manipulated levels of vulnerability and self-efficacy are not, in an absolute sense, low and high, but low and high relative to each other, we chose to label the manipulation levels as *normal* and *increased*, respectively. The main dependent variables were participants' behavioral intentions to engage in APB and participants' denial with respect to AIDS issues.

Procedure

The experiment was conducted in sessions consisting of small groups of 3 to 8 participants. All sessions took place in a large classroom, and participants were separated from one another by at least two empty seats. The study was presented as an experiment designed to investigate students' beliefs, knowledge, and behavior regarding AIDS. At the beginning of each session, participants were informed by the experimenter that, as part of the study, they would read two AIDS-related newspaper articles. The articles were presented as having appeared in a newspaper and were of approximately equal length, but differed in message content. Each subject read one article that focused on vulnerability to HIV and one article that focused on self-efficacy regarding the performance of APB. The experimenter and a female research assistant handed out the two articles (appropriate to participants' condition) and a questionnaire. The participants first read the vulnerability article and then the self-efficacy article at their own pace. On average, it took participants 10 min to read both articles. After reading the articles, participants were asked to place the articles face down and to fill out the questionnaire. Finally, participants were debriefed and received their credits.

Independent Variables

Vulnerability. We did not attempt to decrease women's perceptions of HIV risk since we were concerned that such a manipulation could adversely influence real-life behavior and may not be sensitive to debriefing. Therefore, our messages tried to either increase women's risk perceptions (increased-vulnerability condition) or not to change them (normal-vulnerability condition). A pilot study suggested that this method would be effective. In the pilot, participants received a control or increased-risk message and rated themselves

on several AIDS-related risks (e.g., the probability of becoming infected with HIV as a result of sexual activity, or the probability of already being infected with HIV). As expected, subjects in the increased-vulnerability condition felt significantly more at risk ($M = 39.71$ on a 100-point scale) than did subjects in the control vulnerability condition ($M = 28.88$), $F(1, 25) = 4.56$, $p < .05$.

The message that attempted to increase participants' personal perceptions of vulnerability to HIV infection was presented as a 1993 newspaper article entitled "AIDS Spreads Fastest Among Young Women." The article focused on the young women's increasing risk of being infected with HIV. The sources quoted in the article were the United Nations (i.e., the World Health Organization), the U.S. Centers for Disease Control, and a female specialist on adolescent medicine. The text was spread over two pages and included three subheadings: "U.N. Study Finds Adolescents on Epidemic's Leading Edge" (first page), "AIDS Study Finds Young Women Face Greater Vulnerability" (second page), and "HIV is in the teenage population and it's spreading quickly and silently" (quotation on second page).

The newspaper article in the normal-vulnerability condition did not contain information that was relevant to women's AIDS-risk perceptions. Instead, participants read a 1994 newspaper article discussing a needle-exchange program to reduce the number of AIDS cases among injection drug users (IDUs). This topic was appropriate, since epidemiological research suggests that the prevalence of injection drug use among college students is low (Clifford, Edmundson, Koch, & Dodd, 1989). Therefore, information on IDUs should not affect college students' perceived vulnerability to HIV. Any information that could have possibly affected subjects' perceived vulnerability was omitted from the original article, and no information in the article was related to women's self-efficacy. The text comprised three pages, showed one picture of a volunteer handing out pamphlets, and included two subheadings: "Needle Exchange Reaches Few Drug Addicts In D.C." (first page), and "District Exchanging Few Needles" (second page).

Self-efficacy. The same ethical restriction involved with manipulating perceptions of vulnerability held for the self-efficacy manipulation. Decreasing women's sense of self-efficacy with respect to practicing APB could have negative effects on women's APB following the experiment, even with a debriefing. For this reason, women in the normal self-efficacy condition read an article that did not attempt to affect their perceived self-efficacy. Because our pilot studies and other research (Bakker et al., 1993) suggest that people generally feel they can exercise control over condom use with a new partner, the increased self-efficacy manipulation needed to be quite strong in order to increase feelings of control in this domain. Therefore, women in the increased self-efficacy condition read an article that emphasized the great

potential for women to practice APB very effectively, and were also instructed to think about how they could make sure that condoms would be used when having sexual intercourse with a new partner. In earlier research, this method proved to be effective in increasing people's sense of self-efficacy over condom use with a new partner (Engels, Bakker, & Buunk, 1994). In that study, participants who were instructed to think about how to make sure that condoms would be used had higher perceived control over condom use, compared with participants who only read recommendations in a persuasive message, or participants in a control condition.

In the current research, participants in the increased self-efficacy condition first read an article entitled "Preventing AIDS Not That Hard," which was also described as a 1994 newspaper article. The information presented was said to be the results of a State University of New York study that surveyed female college students aged 17 to 24. A female psychology professor was quoted as reporting that although it may not be "the easiest thing in the world," women can protect themselves from HIV infection by communicating with their partners and by using condoms, and that these behaviors are not overly difficult. The article stated that women generally feel in control of their AIDS-preventive behavior, and presented some creative ways regarding how to talk about and engage in safer sex. The text was printed on two pages and carried three sub-headings: "Research Suggests College Students Feel in Control of Protecting Themselves" (first page), "College Students Take Care of Their Lives" (second page), and "Once you can talk about condoms, using them becomes easy" (quotation on second page). After reading this article, participants were instructed to think about how they could make sure a condom was used when having sexual intercourse with a new partner. Specifically, participants were asked to

imagine that you were going to have sexual intercourse with a new partner and you wanted to use condoms. What would you do, and what would you tell yourself to ensure that condoms were actually used? Please try to imagine yourself in this situation and write down at least three suggestions. (cf. Engels et al., 1994)

We considered this combination of asking women to read a message and actively think of ways to make sure condoms are used a powerful means of inducing high self-efficacy.

Participants in the normal self-efficacy condition read an article that for ethical reasons did not attempt to decrease their sense of self-efficacy. The article was presented as a 1994 newspaper article entitled "Helping Kin Of Those With AIDS" and told the story of a voluntary counseling project in New York City. The text of the article was spread over two pages and did not contain information related to women's self-efficacy or vulnerability with respect to HIV.

Dependent Variables

Behavioral intention. Women's behavioral intentions to engage in APB were measured with three items, each arranged as a 7-point scale (cf. Fishbein & Ajzen, 1975). On each scale, the likelihood of engaging in a particular APB could be rated as 1 (*very unlikely*) to 7 (*very likely*). Participants were asked to indicate whether they intended to always use latex condoms, to discuss safer sexual practices with their sexual partner, and to persuade their sexual partner to engage in safer sex if they were to have intercourse during the next 3 months (cf. Fisher, Fisher, Misovich, Kimble, & Malloy, 1996; Misovich, Fisher, & Fisher, in press). Participants' ratings on these three items were summed to yield an index of behavioral intention, with scores ranging from 3 to 21. The reliability of this scale using Cronbach's alpha was .82.

AIDS risk denial. Participants were asked to respond to five items reflecting means that people can use in order to avoid or deny AIDS threats. The items are: "I try not to think about getting infected with HIV," "When you feel you have gotten to know somebody well, you no longer need to practice safer sex," "If you know a person's sexual history and lifestyle, it is unnecessary to use condoms," "If two people have sex only with each other, they don't have to practice 'safer sex'," and "You only need to use condoms during 'one-night stands'." For each of these items, a 5-point Likert-type scale was used, ranging from 1 (*strongly agree*) to 5 (*strongly disagree*). Cronbach's alpha was modest (.64).

Manipulation Checks

Perceived vulnerability. To detect the effectiveness of the vulnerability manipulation, participants were asked to estimate the probability of getting infected with HIV during the forthcoming year. For this measurement, a risk assessment scale developed by Linville, Fischer, and Fischhoff (1993) was used. This scale ranges from .01% (presented both as .01% and 1 in 10,000) to 100%, and enables discrimination between low-probability risk estimates. The absence of a significant correlation between the denial and vulnerability measures supports our contention that these measures assess distinct constructs ($r_{\text{denial, vulnerability}} = .02, ns$).

Self-efficacy. The effects of the self-efficacy manipulation were examined by asking the participants how easy or hard it would be for them to persuade a partner to use a condom. To check whether the self-efficacy manipulation which focused primarily on condom use impacted on other APB as well, participants' perceived self-efficacy on two ancillary items was measured by asking how easy or hard it would be to discuss getting tested for HIV, or to persuade a partner to get tested for HIV. Participants were also asked to rate themselves as to how effectively or ineffectively they could perform these

behaviors³ (cf. Fisher et al., 1996; Misovich et al., in press). For each of these six items, a 9-point scale ranging from 1 (*very hard, very ineffectively*) to 9 (*very easy, very effectively*) was used. The six items could be combined into a measure assessing self-efficacy (Cronbach's $\alpha = .80$).

Results

Manipulation Checks

Perceived vulnerability. An ANOVA using the risk measure as a dependent variable and the vulnerability and self-efficacy conditions as independent variables revealed a marginal perceived vulnerability main effect. Compared with subjects in the normal vulnerability condition ($M = 0.86$, $SD = 2.25$, range = 0 to 10), women in the increased vulnerability condition ($M = 3.04$, $SD = 8.21$, range = 0 to 40) estimated the probability of becoming infected with HIV to be somewhat higher, $F(1, 86) = 2.90$, $p < .10$. No other main or interaction effect was found.

Self-efficacy. The effectiveness of the self-efficacy manipulation was checked by examining responses to the measure described in the Method section. Subjects in the increased self-efficacy condition were more likely to report that they were in control of APB ($M = 8.13$ on a 9-point scale, $SD = 1.57$) than were subjects in the normal self-efficacy condition ($M = 7.01$, $SD = 1.84$), $F(1, 80) = 8.55$, $p < .01$. This result indicates that the manipulation of self-efficacy was successful.

Behavioral Intention

We predicted that women who both feel vulnerable to HIV and who have a high sense of self-efficacy with regard to APB would intend to engage in APB more than women who perceive less risk or less self-efficacy over their AIDS-preventive efforts. First, the 2×2 (Vulnerability \times Self-Efficacy) ANOVA revealed a main effect for self-efficacy, $F(1, 84) = 4.01$, $p < .05$. Women who believed that they had high self-efficacy with respect to engaging in APB intended to engage in APB more ($M = 17.28$, $SD = 4.69$) than did women who felt less in control ($M = 14.82$, $SD = 5.90$). Second, and consistent with our predictions, a significant interaction effect was found for perceived vulnerability and self-efficacy, $F(1, 84) = 4.10$, $p < .05$. This interaction suggests that having a high perceived vulnerability to HIV has a

³There is some discussion about the validity of perceived difficulty of APB as a measure of self-efficacy. In the present study, the three items tapping difficulty and the three items tapping effectiveness of APB were highly correlated ($r = .67$, $p < .001$). This supports the contention that difficulty and effectiveness are both aspects of self-efficacy.

Table 1

Mean Behavioral Intention to Engage in APB as a Function of Perceptions of Vulnerability and Self-Efficacy

	Vulnerability	
	Normal	Increased
Normal self-efficacy		
<i>M</i>	15.14 _a	14.50 _b
<i>SD</i>	5.91	5.99
<i>n</i>	24	22
Increased self-efficacy		
<i>M</i>	15.11 _c	19.14 _{abc}
<i>SD</i>	5.87	2.13
<i>n</i>	21	21

Note. Higher values reflect stronger behavioral intentions to engage in APB. Means sharing a subscript differ by Duncan's multiple range tests at $p < .05$.

Table 2

Mean AIDS Risk Denial as a Function of Perceptions of Vulnerability and Self-Efficacy

	Vulnerability	
	Normal	Increased
Normal self-efficacy		
<i>M</i>	1.93	1.97
<i>SD</i>	0.65	0.78
<i>n</i>	24	22
Increased self-efficacy		
<i>M</i>	2.11 _a	1.67 _a
<i>SD</i>	0.67	0.42
<i>n</i>	21	21

Note. Higher values reflect a stronger tendency to deny AIDS threat (possible range from 1 to 5). Means sharing a subscript differ by Duncan's multiple range tests at $p < .05$.

positive impact on the intention to engage in APB only when a high sense of self-efficacy is also experienced. Indeed, the increased-vulnerability–increased-self-efficacy condition was the only condition in which stronger behavioral intentions were reported, relative to the control condition (see Table 1 for means and results of a planned contrast analysis). The control condition corresponds to people's untreated states of perceived vulnerability and self-efficacy. In effect, these findings indicate that manipulations that increase individuals' level of perceived vulnerability to HIV will only have a positive impact on individuals' intentions to protect themselves from HIV infection if they think they can actually perform APB.

*AIDS Risk Denial*⁴

A marginal interaction effect of vulnerability and self-efficacy was found for AIDS risk denial, $F(1, 84) = 3.20, p < .08$. This result seems to suggest that denying an AIDS threat is more likely for people who do not feel both at risk and in control over APB than for people who do meet both requirements. However, a contrast analysis used to determine which effects qualify the interaction did not fully support this contention. The test comparing denial scores revealed a significant difference between normal and increased vulnerability in the increased self-efficacy condition, suggesting that people with a higher sense of self-efficacy engage in less denial only when they feel at risk (see Table 2 for means and results of a contrast analysis). No effect in the normal self-efficacy condition was found.

Discussion

The present study applied constructs of protection motivation theory (Ripetoe & Rogers, 1987; Rogers, 1983) to examine the effects of perceived vulnerability to HIV and self-efficacy on women's intention to engage in APB. A significant finding, with important conceptual and applied implications, is that women were most likely to intend to engage in APB if they felt both vulnerable to HIV infection and efficacious with respect to performing APB. As noted earlier, the levels of perceived vulnerability and self-efficacy which were examined were low and high, relative to each other. Conceptually, this result supports the central assertion of protection motivation theory, which holds that perceptions of both vulnerability and self-efficacy determine

⁴Although not part of our hypotheses, denial and behavioral intention were expected to be negatively related (Rogers, 1983). A correlational analysis supported this contention, suggesting that denial of an AIDS threat and the intention to engage in APB are strongly entwined ($r_{\text{denial, intentions}} = -.57, p < .001$). Since behavioral intention did not account for all variance in denial, we considered both constructs to have separate, but related effects.

individuals' intention to engage in preventive behavior (Rippetoe & Rogers, 1987). Protection motivation theory, therefore, can offer an explanation for why several previous studies did not find a relationship between perceived vulnerability to HIV and APB (see Gerrard et al., 1996, for a review).

Consistent with theoretical predictions, our research offers empirical evidence for the contention that it is not sufficient to focus solely on perceived vulnerability in order to understand the impact of AIDS-risk information. In effect, perceptions of a high personal risk only lead people to intend to engage in APB if, at the same time, they believe that they can effectively cope with this high risk. One could argue that it is equally plausible to conclude that a high sense of self-efficacy will only lead people to intend to engage in APB if, at the same time, they feel at risk of HIV infection. For two reasons, we chose to focus on the former interpretation. First, health education often stresses the importance of perceived vulnerability as a prerequisite for behavior change, assuming that feeling at risk of a health threat is a reason for self-protection. Second, high self-efficacy in the context of low risk perceptions is not likely to have negative side effects (assuming that these risk perceptions are accurate). However, feeling at risk of HIV infection in the context of low self-efficacy may lead people to deny their risk, regardless of the accuracy of their self-efficacy appraisals (Morris & Swann, 1997). Since the present study was not able to support this contention, future research is needed for empirical support. Our results do suggest that if women do not believe that they are capable of engaging in APB, they will be less inclined to engage in APB than if they believe that they are in control over preventive behavior. This is in full support of the important role Bandura (1989, 1994) subscribes to self-efficacy with respect to self-protective health behavior.

From an applied point of view, the present study may have important implications for AIDS education. Even with small-scale manipulations, it was shown that convincing women that they are at risk of getting infected with HIV is not sufficient for them to intend to engage in APB. In fact, in the absence of self-efficacy information, it could even be dangerous because it can lead to an actual denial of AIDS threat (Morris & Swann, 1997). In order to persuade individuals to engage in APB, they should both believe that they are vulnerable to HIV and believe that they are in control of performing APB. AIDS-risk behavior-change interventions must therefore take the effects of both constructs into account in order to affect preventive behavior. This could be achieved by specifically encouraging people's sense of control over APB when informing individuals about a possible high personal risk for HIV. For example, after showing people a videotape which can make them feel more vulnerable to HIV, these people can be asked to think of ways to protect themselves (cf. Engels et al., 1994). This method has been proven to be effective in increasing individuals' sense of self-efficacy with respect to condom use. Also, clear information about negotiating safer sex and other

required behavioral skills could enhance people's self-efficacy (Fisher et al., 1996). In our study, it was this combination of reading an informational message and actively looking for options to ensure condom use that enhanced self-efficacy. In effect, each intervention program which attempts to increase people's awareness of their possible vulnerability to HIV infection should also contain components that increase people's sense of self-efficacy. By also trying to enhance self-efficacy, messages that advocate APB by stressing perceptions of vulnerability will less likely result in maladaptive coping processes.

The present study examined potentially harmful, maladaptive coping strategies (i.e., denial of one's own HIV risk) to understand how psychological processes resulting from manipulations of perceived vulnerability and self-efficacy affected women's intention to engage in APB. Our results suggest that in situations where people feel both vulnerable to HIV and in control over APB, they will be less likely to engage in denial, but only compared with individuals in the normal-vulnerability-high-self-efficacy situation. In our research, women who felt at risk but who were led to believe that they could undertake effective action appeared not to experience the need to deny personal relevance of AIDS issues. Rather, as was confirmed by our findings for behavioral intentions, these women intended to cope effectively with their AIDS-related concerns by engaging in APB. In other words, a message which contains information about a high personal risk for HIV and a high level of self-efficacy regarding APB may lead people to consider their own risk for HIV (rather than deny it) and to think that they can deal effectively with an AIDS threat. Consequently, as predicted by protection motivation theory, they may intend to engage in APB. People who are confronted with a message which does not include both prerequisites may apply more defensive coping mechanisms, such as denial of the personal relevance of APB for themselves. Consequently, their intentions to engage in APB may be lower than people in the high-vulnerability-low-self-efficacy situation. Since our results on denial processes failed to reach conventional levels of significance, future research is needed to provide a conclusive account.

In summary, the findings in the present study are important from both a conceptual and an applied perspective. However, a shortcoming of this study is that it focuses on self-reported intentions. It is conceivable that people who feel at risk for HIV and who perceive themselves capable of engaging in safer sex will have to overcome other barriers before their intentions are translated in actual safer sexual behavior. For example, people's intentions to use condoms may not be predictive of behavior if they are under the influence of drugs or alcohol the next time they have sex. This stresses the importance of research on factors intervening between behavioral intentions and actual behavior.

It should also be noted that the results on the vulnerability manipulation check were not compelling. However, the significant interaction effect for

perceived vulnerability and self-efficacy on behavioral intentions was consistent with our predictions. This suggests a weakness in our manipulation check for vulnerability, not in our manipulation itself.

Finally, one has to bear in mind that the reported results hold only for the population of female college students. Since AIDS-prevention interventions can have dissimilar effects on different populations (Coates, 1990; Fisher & Fisher, 1992), it is inadvisable to generalize these results to populations other than the one at focus in this research. Future research should examine the effects of perceived vulnerability to HIV infection and self-efficacy on the intention to engage in APB within other populations as well.

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