

## Optimism, Coping, Psychological Distress, and High-Risk Sexual Behavior Among Men at Risk for Acquired Immunodeficiency Syndrome (AIDS)

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In a cohort of gay men responding to the threat of acquired immunodeficiency syndrome (AIDS), dispositional optimism was associated with less distress, less avoidant coping, positive attitudes as a coping strategy, and fewer AIDS-related concerns. Men who knew they were seropositive for human immunodeficiency virus (HIV) were significantly more optimistic about not developing AIDS than men who knew they were seronegative for HIV. This AIDS-specific optimism was related to higher perceived control over AIDS and to active coping among seropositive men only and to health behaviors in both serostatus groups. There was no relation of optimism to risk-related sexual behavior. It is concluded that optimism is psychologically adaptive without necessarily compromising health behavior. It is also concluded that it is useful to distinguish between event-based optimistic expectations and dispositional optimism.

Substantial research suggests that people are overly optimistic about the likelihood that they will experience a wide variety of positive life events and successfully avoid a wide variety of adverse events (e.g., Markus & Nurius, 1986; Perloff, 1983; Weinstein, 1980, 1982, 1984). Most people perceive their chances of having a happy life, a stable marriage, talented children, and a satisfying job as higher than those of the average person and their chances of being fired, getting divorced, becoming depressed, or having a major disease as lower than those of the average person. Theoretical accounts of this unrealistic optimism have diverged in terms of whether it is regarded as fundamentally adaptive or maladaptive.

Taylor and Brown (1988) suggested that unrealistic optimism about the future is generally adaptive in that it promotes the criteria normally associated with the mentally healthy personality, including feelings of self-worth, the ability to care for and about others, persistence and creativity in the pursuit of goals, and the ability to cope effectively with stress (see also Taylor, 1989). Such optimism may become particularly adaptive when

an individual is facing threatening circumstances (Taylor, 1983).

In their examinations of optimism as a dispositional construct, Scheier, Carver, and their associates (Scheier & Carver, 1985; Scheier et al., 1989; Scheier, Weintraub, & Carver, 1986) found an optimistic nature to be associated with more effective coping with stress. For example, in studies conducted with college undergraduates, they found that optimism was associated with greater use of problem-focused coping, seeking of social support, and emphasizing the positive aspects of a stressful situation. Pessimism, in contrast, was associated with denial and distancing from the event, with focusing directly on stressful feelings, and with disengagement from the goal with which the stressor was interfering. Considerable research suggests that such avoidant coping strategies are generally associated with a less effective response to stress, especially to chronic stressors (e.g., Aspinwall & Taylor, in press; Felton, Revenson, & Hinrichsen, 1984; Holahan & Moos, 1987a, 1987b; Kaloupek, White, & Wong, 1984; Kiyak, Vitaliano, & Crinean, 1988; Quinn, Fontana, & Reznikoff, 1987; Suls & Fletcher, 1985; Cronkite & Moos, 1984; Wong & Kaloupek, 1986).

In contrast, Weinstein (1980, 1982) suggested that unrealistic optimism may prevent people from perceiving the objective risks of external events and preparing appropriately for them. In the context of health issues, for example, he argued that people with a falsely optimistic assessment of their future health risks may fail to practice appropriate health behaviors that could lead them to reduce their risk of these disorders.

The acquired immunodeficiency syndrome (AIDS) situation provides a good model for examining the potential adaptive and maladaptive consequences of unrealistic optimism for several reasons. Within the gay community, some men believe that they are invulnerable to the adverse effects of the human immunodeficiency virus (HIV) that causes AIDS. This belief can be observed in popular books (e.g., Callan, 1990) and is reported anecdotally by individuals in the gay community and by clini-

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cians who work with individuals at risk for AIDS. The belief appears to exist not only among men who are seronegative, but also among those who have tested positive for HIV. Yet many in the medical community believe that many, perhaps most, HIV-seropositive individuals will eventually develop AIDS. Thus, these beliefs in invulnerability among the HIV-seropositive men can be considered optimistic, perhaps even unrealistically optimistic. The potential of such beliefs to compromise risk-reducing sexual behavior is an important issue, given the need to contain the AIDS epidemic.

The purpose of the present investigation was to examine the relationship of optimism to coping strategies, adjustment, and health behaviors among gay men, thereby providing some potential to test previous hypotheses about the adaptiveness or maladaptiveness of optimism. Because of related conceptual work indicating the importance of assessing situation-specific expectations, as well as general expectations (e.g., Bandura, 1986, 1989; Folkman, 1984; Wallston, Wallston, & DeVellis, 1978), we examined these relationships both for dispositional optimism, as assessed by the Life Orientation Test (LOT; Scheier & Carver, 1985), and for AIDS-specific optimism, as assessed by beliefs about the personal likelihood of developing AIDS.

## Method

### Sample

The sample was recruited from an existing cohort of approximately 1,400 gay and bisexual men participating in the Multicenter AIDS Cohort Study (MACS) in Los Angeles. The MACS is a multisite collaborative longitudinal research study of the epidemiology and natural history of AIDS (Kaslow et al., 1987). It is designed to determine the factors associated with the risk of HIV infection and the factors affecting the course of HIV infection among HIV-seropositive individuals. Between April 1984 and December 1985, 1,637 participants were enrolled in the Los Angeles MACS cohort. Inclusion criteria were 18 years of age or older, no diagnosis of AIDS or cancer (excepting skin cancer), and no radiation therapy. Participants ranged in age from 18 to 50 years, with a mean age of 32. In 1984, 49.5% were HIV seropositive. In addition, 122 intimate partners of MACS participants (age range 18 to 57,  $M = 33$ ) were recruited into the study in 1986. Ninety-five percent of the total sample were White (including White Hispanic). The majority of participants had at least a college education (55%) and were employed in professional or managerial positions (51%).

Between August 1987 and October 1988, active MACS participants, except those diagnosed with AIDS, were offered the opportunity to participate in our study, which we call the Natural History of AIDS—Psychosocial Study (NHAPS). This substudy was designed to determine current psychological appraisals of, emotional responses to, and methods of coping with the risk of developing AIDS and the impact of these processes on behavior and health. We recruited 798 into the NHAPS. Over this same period, approximately 1,330 men without AIDS visited the parent MACS study for their exam, yielding a participation rate in our study of 60%.

Our sample is very similar demographically to the overall MACS sample, with over 90% being White and 66.6% having at least a college education. Participants in the NHAPS study ranged in age from 22 to 60 with a mean age of 36. The mean age of all MACS participants without AIDS who visited the Los Angeles MACS study during our enrollment period was also 36, with a range of 22 to 60.

This article centers on the 550 participants who know their HIV antibody status; 238 of these participants are HIV seropositive and 312

are HIV seronegative. We excluded 169 participants who had chosen not to know their HIV-antibody status and 35 who reported "receiving an ARC [AIDS-related complex] diagnosis from a physician." (ARC is generally considered to be a pre-AIDS condition, and we wanted to exclude the men with symptoms of illness and men who believed they were already sick.) Forty-four participants were excluded because of missing or incomplete data.

### Design

As part of the parent MACS study, participants are assessed at 6-month intervals. Assessment procedures include a physical examination to detect signs and symptoms of AIDS, collection of blood and other specimens for virological and immunological studies, and an interview assessing factors that may contribute to seroconversion or the development of AIDS, including high-risk sexual behavior. HIV antibody status and the absolute number of CD4 helper/inducer and CD8 suppressor/cytotoxic T cells are assessed every 6 months on the basis of blood samples drawn at the MACS visits.

As part of our psychosocial substudy, participants were mailed a questionnaire packet before one of their MACS examinations and asked to fill it out the day before the exam and return it by hand at the MACS exam site or by mail. The questionnaire packet consisted of a number of standard psychological scales, as well as AIDS-related questionnaires developed during pilot testing. As previously noted, the return rate for this questionnaire was 60%.

### Psychosocial Assessment Procedures

*Knowledge of HIV status.* Respondents were asked whether they had "ever received results from an AIDS (HIV) antibody test?" Respondents who answered yes were asked whether they were HIV positive or negative. The answer to this question was checked against their actual antibody status. HIV status was objectively determined on the basis of blood samples drawn at the MACS visits. Blood samples were subjected to enzyme-linked immunosorbent assay (ELISA) tests, and positive tests were confirmed by western blot (Nishanian et al., 1987). On the basis of this information, two groups were formed: those who knew they were HIV seropositive and those who knew they were HIV seronegative. Two participants who reported being HIV seronegative but who were actually HIV seropositive were excluded from further analyses.<sup>1</sup>

*Attitudes and knowledge about AIDS.* A 28-item questionnaire assessed each participant's knowledge about AIDS and his sense of personal vulnerability to AIDS. Some items were selected from the AIDS Denial Scale developed by the San Francisco Biopsychosocial Project (Weber, Coates, & McKusick, 1986). On the basis of pilot testing results, a few of these items were reworded for clarification. In addition, items assessing a sense of personal vulnerability to AIDS and items assessing knowledge of AIDS were added in an effort to develop at least two distinct factors: Factual Knowledge About AIDS and Optimism About the Likelihood of Not Developing AIDS.<sup>2</sup> Respondents

<sup>1</sup> Concerns might be raised about the possibility of respondents receiving false-positive or false-negative HIV antibody results. It should be noted that the multiple test procedure used by the parent study produces virtually no errors. Moreover, because the respondent's antibody status is reassessed at each MACS visit (i.e., twice a year), there is virtually no possibility of false-negative or false-positive HIV tests in this sample.

<sup>2</sup> The reason for factor analyzing these items together was that one cannot define an individual as unrealistically optimistic about his chances of developing AIDS if he is actually not aware of the nature of AIDS as a disease and the health risk it entails. Thus, it was anticipated that at least two factors would emerge, one reflecting optimism and the other reflecting knowledge about the nature of AIDS.

indicate their agreement with each item on a 5-point scale ranging from *strongly agree* to *strongly disagree*.

**Life Orientation Test (LOT).** To measure dispositional optimism, we used the LOT, which consists of 12 items, such as "In uncertain times, I usually expect the best," and "If something can go wrong for me, it will."<sup>3</sup> Respondents indicate their agreement with each item on a 5-point scale, ranging from *strongly agree* to *strongly disagree*. The LOT has acceptable psychometric properties and good discriminant validity with respect to related concepts such as locus of control, hopelessness, and psychological adjustment (Scheier & Carver, 1985).

**Coping with thoughts of developing AIDS.** Coping With Thoughts of Developing AIDS is a 48-item scale based on the Ways of Coping Scale (Folkman & Lazarus, 1980). In its administration, respondents select (or are given) a particular stressful event and are asked how they coped with it. The respondent is instructed to indicate on a 4-point scale the extent to which he or she used each of the coping strategies listed to deal with the stressor over a specific time frame. Because pilot testing had identified coping with thoughts of developing AIDS as the major AIDS-related stressful event experienced by both the HIV-seropositive and HIV-seronegative men in this sample, the scale asked participants to indicate the ways in which they had coped over the past month with "thoughts of developing AIDS." Coping items from the Ways of Coping Scale were excluded from use with this population if they could not be used to deal with thoughts of developing AIDS (e.g., "Tried to get the person responsible to change his or her mind"). In addition, some AIDS-related coping strategies suggested by pilot participants were added (e.g., "Attend support groups" and "Meditate, use relaxation, or visualization"), and some original scale items were reworded slightly to make them specific to coping with thoughts of developing AIDS (e.g., "If I got full-blown AIDS" was added to "I went over in my mind what I would say or do" and "I tried to keep my feelings to myself" became "Try to keep my feelings about AIDS to myself").

**Psychological distress.** Measures of psychological distress included the Hopelessness Scale and the Profile of Mood States (POMS). The Hopelessness Scale (Beck, Weissman, Lester, & Trexler, 1974) measures negative expectations about the future and includes 20 true-false items. The internal consistency of the scale is high,  $\alpha = .93$  (Beck et al., 1974). Validity studies support the Hopelessness Scale as a measure of hopelessness (e.g., Beck et al., 1974). The POMS (McNair, Lorr, & Droppleman, 1971) is a measure of current mood state. Respondents rate how much they have been feeling each of 65 affects over the past week on a 5-point scale. The following mood scores can be derived: tension-anxiety, depression-dejection, anger-hostility, fatigue-inertia, vigor-activity, and confusion-bewilderment. The POMS was selected because of its previous use in studies of individuals with cancer and AIDS and its high internal consistency (ranging from .74 to .91 for its subscales) and predictive validity.

A psychological distress score was developed that included scores from the Hopelessness Scale and the depression-dejection, tension-anxiety, and anger-hostility subscales of the POMS.<sup>4</sup> These four scores were standardized and summed to form the psychological distress score.

**AIDS-related worries and concerns.** AIDS-related concerns were conceptualized as being composed of symptomatic, affective, and cognitive components. Scores from each component were standardized and summed to form an AIDS-related worries and concerns score. To assess concerns about symptoms, participants rated how often they found themselves "thinking that a physical symptom you have developed (for example, a sore throat or fatigue) may be the first symptom of AIDS?" Response options for this question ranged from *not at all* to *almost continually*. To assess affect with respect to worries and concerns about developing AIDS, participants made ratings on 7-point Likert-type scales indicating the degree to which they felt anxious, fearful, worried, threatened, concerned, and distressed overall during the past month over their own risk of developing AIDS. These items

were summed to form an index. To assess intrusive thoughts of developing AIDS, we asked participants to rate how often over the past month "did thoughts of developing AIDS intrude into your day-to-day thoughts?" Options ranged from *not at all* to *almost continuously* on 7-point Likert-type scales.

**Perceived risk of and control over AIDS.** Respondents were asked two questions about their perceived risk of developing AIDS. The first was adapted from the Chicago MACS psychosocial questionnaire (Joseph et al., 1987) and assessed absolute perceived risk: "Considering all of the different factors that may contribute to AIDS, including your own past and present behavior, what would you say are your chances of getting AIDS?" The second question assessed perceived control over the risk of developing AIDS: "Overall, how much control do you feel you have over whether or not you will develop AIDS?" Response options ranged from *not at all* to *very much* on 7-point Likert-type scales.

**Presence of an intimate partner.** Respondents were asked two questions about relationships: "Are you currently in an intimate relationship [with a spouse or partner]?" and "Do you currently have a primary romantic, sexual or intimate partner?" An answer of yes to either question was regarded as the presence of a partner.

### Health Behavior Assessment Procedures

Health behaviors were assessed by questionnaire and interview methods. The questionnaire measure consisted of the Behaviors to Reduce the Risk of AIDS Scale, a 30-item scale reflecting behaviors that might be used to reduce one's risk of AIDS (e.g., exercise and changes in nutrition) or to decrease the chances of being exposed to HIV (e.g., "I follow safe sex guidelines" and "I have sex with one or a few partners whom I trust to be 'safe' partners"). Items suggested by pilot participants were included (e.g., "I attend groups and workshops on self-mastery and AIDS" and "I avoid using recreational drugs completely or limit my recreational drug use"). The respondent was instructed to indicate on a 4-point scale the extent to which he used each of 30 behaviors to decrease his risk of developing AIDS over the past month.

Sexual behavior was assessed through confidential structured interviews as part of the MACS exam. The sexual behaviors considered in this study were restricted to behaviors that involve the potential exchange of bodily fluids and thus carry a high risk for HIV infection. Calculation of the number of sexual partners included only partners with whom the respondents had engaged in oral or anal intercourse. At each interview, participants were asked how many different men they had had sexual intercourse with during the past 6 months. Sexual intercourse was defined as follows: "You put your penis in your partner's mouth or rectum—or your partner put his penis in your mouth or rectum." Next, the men were asked how many of these partners were anonymous; that is, they would not know how to find them again. Finally, the men were asked how many of their partners for anal receptive intercourse never used a condom.

We analyzed data from two MACS visits, the first from the day they returned their psychosocial questionnaire and the second from a visit approximately 6 months later. Having two assessments of sexual behavior enabled us to assess both the concurrent and predictive relationships between optimism and high-risk sexual behavior. The sample for analyzing these sexual behaviors was somewhat smaller than that examining the questionnaire data. It included 171 HIV-seropositive men

<sup>3</sup> This scale and other dispositional measures were administered once through the mail to all participants during the first wave of data collection.

<sup>4</sup> The confusion-bewilderment, fatigue-inertia, and vigor-activity subscales of the POMS were not included because of the possibility that responses to these scales might be confounded by the physical health status of the respondents.

and 240 HIV-seronegative men. One-hundred thirty men were missing data from one or both MACS visits. Two men who reported having been paid for sex were removed from the sample.

## Results

The results begin with analyses that led to the development of the measures for this study. We then relate the optimism measures to measures of psychological distress and coping. The third set of analyses relates the optimism measures to health-promoting behavior and to high-risk sexual activity.

### Factor Analyses of Attitude Scales and Coping Scales

*Attitudes and knowledge about AIDS.* The items assessing attitudes and knowledge about AIDS were factor analyzed, using an oblique rotation to permit intercorrelation of the factors. Five factors with eigenvalues greater than 1 emerged. The first factor (six items,  $\alpha = .60$ ) assessed *AIDS-Specific Optimism* (e.g., "I feel safe from AIDS because I've developed [or if exposed, would develop] an immunity," "A person can be exposed to AIDS and successfully eliminate the virus from his body," and "I think my immune system would be (is) more capable of fighting the AIDS virus than that of other gay men"). It appears to reflect a belief of invulnerability to developing AIDS. The second factor (six items,  $\alpha = .59$ ) represents a *Denial of the Importance of AIDS* (e.g., "AIDS is a smaller problem than the press makes it out to be," and "The gay press is too preoccupied with AIDS"). The third factor (seven items,  $\alpha = .55$ ) appears to represent a *Realistic Appraisal* of risks and adjustment to AIDS and AIDS knowledge (e.g., "AIDS can be transmitted by one sexual contact," and "Life is just not the way it was, and we all have to adjust to AIDS"). The fourth factor (six items,  $\alpha = .41$ ), termed *Fatalistic Vulnerability*, appeared to represent the absence of optimism. Items indicated a belief that the outcome of AIDS is inevitable and only extreme measures can prevent it (e.g., "The spread of AIDS cannot be prevented," and "I have to stop sex completely to avoid getting AIDS"). The fifth factor (three items,  $\alpha = .43$ ) represents certain aspects of *AIDS Knowledge* (e.g., "AIDS can be transmitted by semen," and "AIDS can be transmitted by blood"). Only the first factor, AIDS-Specific Optimism, and the fourth factor, Fatalistic Vulnerability, will be discussed in this article, because they are related to the construct of interest, namely, optimism. They are correlated  $-.12$  ( $p < .06$ ) for HIV-seropositive men and  $-.09$  ( $p < .12$ ) for HIV-seronegative men.

*Coping With Thoughts of Developing AIDS items.* The items assessing coping with thoughts of developing AIDS were factor analyzed using an oblique rotation to permit intercorrelation of the factors. Five factors with eigenvalues greater than 1 emerged. The first factor (10 items,  $\alpha = .82$ ) contains items representing the process of maintaining *Positive Attitudes* (e.g., "Try to keep a positive outlook on life," and "Try to keep myself from worrying about getting AIDS, since there is no use in worrying").<sup>5</sup> The second factor (eight items,  $\alpha = .78$ ), *Personal Growth—Helping Others*, represents personal growth, involving spiritual activities or developing oneself as a person (e.g., "Find a new faith") and helping others (e.g., "Do nice things for people to feel better"). The third factor (seven items,  $\alpha = .76$ ) primarily includes items involved with *Seeking Social Support* of various

forms, including emotional support, as well as advice and informational support (e.g., "Ask a relative or friend I respect for advice," and "Talk to someone about how I am feeling"). This factor also includes two items that focus on thinking about or analyzing the problem (e.g., "Think about what I can do to reduce my risk"). The fourth factor (nine items,  $\alpha = .69$ ), *Fatalism/Self-Blame/Escape-Avoidance*, includes three components, fatalism (e.g., "Prepare myself for the worst"), self-blame (e.g., "Realize I brought this risk on myself"), and escape-avoidance, including both cognitive and behavioral methods of avoidance (e.g., "Daydream or imagine a better time or place than the one I am in," and "Try to make myself feel better by overeating, drinking, smoking, using drugs or medications"). The fifth factor (three items,  $\alpha = .56$ ), *Avoidance of AIDS*, involves avoidance of information or thoughts concerning AIDS (e.g., "Keep myself from thinking too much about AIDS").

*Behaviors to reduce AIDS risk.* The factor analysis procedures described above produced a four-factor solution. The first factor (eight items,  $\alpha = .84$ ) includes a range of general *Health-Promoting Behavior* (e.g., healthy diet, jogging, getting enough sleep, relaxation). The second factor (four items,  $\alpha = .73$ ), *Limit Sexual Partners*, involves limiting the number of sexual partners and limiting sex to individuals considered "safe." The third factor (five items,  $\alpha = .62$ ), *Limit Social Contact With Gay and HIV-Seropositive Men*, includes items describing the limiting of social contact with the gay community to control sexual activity and limiting social contact with HIV-seropositive persons or persons with AIDS. The fourth factor (two items,  $\alpha = .67$ ) focused on the *Practice of Safe Sex*. It should be noted that the two factors, Limit Sexual Partners and Practice Safe Sex, constitute additional measures of high-risk sexual behavior using a method (questionnaire) different from that adopted in the MACS interview (see Method section). The intercorrelations among the psychosocial variables are presented in Table 1.

### Optimism in HIV-Seropositive Compared With HIV Seronegative Men

The two serostatus groups were compared on the AIDS-specific optimism and the fatalistic vulnerability factors using analysis of covariance, controlling for age and the presence of an intimate partner. HIV-seropositive participants had higher AIDS-specific optimism scores ( $M = 1.94$ ) than HIV-seronegative participants ( $M = 1.72$ ),  $F(1, 537) = 17.80$ ,  $p < .0001$ . All analyses controlled for age and partner status because preliminary analyses indicated that age and partner status are significantly associated with psychological distress and AIDS-related concerns. In addition, increasing age and the presence of a primary partner tend to be negatively associated with numbers of sexual partners and numbers of anonymous sexual partners.

<sup>5</sup> On the surface, it might appear that AIDS-specific optimism and Positive Attitudes would be quite similar. However, the content of these scales is, in fact, very different. AIDS-specific optimism items consist of beliefs that reflect one's perceived risk for developing AIDS. Items assessing Positive Attitudes refer to attempts to look at the positive aspects of HIV. No items in the Positive Attitudes scale reflect a belief that one is invulnerable to AIDS, which is the primary content of the AIDS-specific optimism items.

Table 1  
Correlations Among Psychosocial Variables for HIV-Seronegative and HIV-Seropositive Men

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1. AIDS-related worries & concerns	—															
2. Psychological distress	.23****	—														
3. Perceived risk	.53****	.17****	—													
4. Perceived control	-.41****	-.22****	-.69****	—												
5. Life Orientation Test	-.17**	-.59****	-.14*	.22****	—											
AIDS-Specific Optimism	-.07	-.12**	-.09*	.15****	.18**	—										
6. Fatalistic Vulnerability	.17****	.28****	.12**	-.16****	-.24****	-.12**	—									
7. Positive Attitudes Personal	.008	-.31****	.01	.05	.39****	.23****	-.21****	—								
8. Growth-Helping Others	.01	-.06	-.06	.10*	.14*	.22****	-.17***	.51****	—							
9. Seeking Social Support	.10*	-.07	.00	.06	.09	.03	-.09	.43****	.51****	—						
10. Fatalism/Self-Blame/Escape-Avoidance	.40****	.37****	.36****	-.31****	-.32****	-.11*	.28****	.10*	.03	.09*	—					
11. Avoidance of AIDS	.05	.01	.04	-.03	-.03	.19****	.08	.35****	.15****	.13**	.19****	—				
12. Health-Promoting Behavior	.29****	-.06	.23****	-.16***	.13*	.19****	-.04	.31****	.27****	.30****	.05	.21****	—			
13. Limit Sexual Partners	.04	-.04	-.04	.05	.04	.04	.01	.18****	.17***	.23****	.02	.11*	.24****	—		
14. Limit Social Contact With Gay and HIV-Seropositive Men	.11**	.10*	.00	-.04	-.05	-.01	.27****	.11*	.10*	.05	.19****	.24****	.15***	.23****	—	
15. Practice of Safe Sex	.11*	-.03	.04	-.04	-.02	.00	-.10*	.09	.05	.14**	-.07	.05	.12**	.11*	.05	—
16. Age	.02	.09	-.01	.00	-.11	-.09	.14**	-.05	.02	.00	.01	-.08	-.09*	-.02	.10*	.04

Note. HIV = human immunodeficiency virus; AIDS = acquired immunodeficiency syndrome.  
\*  $p < .05$ . \*\*  $p < .01$ . \*\*\*  $p < .001$ . \*\*\*\*  $p < .001$ .

There was no difference between the groups on the fatalistic vulnerability factor (seropositive  $M = 1.95$ ; seronegative  $M = 2.02$ ). There was no significant difference between the HIV-seropositive ( $M = 29.94$ ) and HIV-seronegative men ( $M = 29.14$ ) on dispositional optimism as assessed by the LOT. When individuals high and low on dispositional optimism and AIDS-specific optimism were evaluated with respect to demographic characteristics, there were no differences between optimists and pessimists on age, partner status, or educational level.

The finding that HIV-seropositive men have higher levels of AIDS-specific optimism than HIV-seronegative individuals required additional analyses for its meaning. Specifically, it is possible that those who are optimistic about not developing AIDS are more likely to practice risky sex and become HIV seropositive as a result of their AIDS-specific optimism. Alternatively, consistent with our theoretical analysis, AIDS-specific optimism may arise as a coping strategy in response to the discovery that one is HIV seropositive. To shed light on this issue, we evaluated a group of subjects who had chosen not to find out their serostatus and compared the HIV-seropositive and HIV-seronegative men. There were no differences between the two groups on age, education, or race. They also did not differ on dispositional optimism, coping scores, or three of the four behavioral coping scores.<sup>6</sup> Most important, the two groups did not differ on AIDS-specific optimism, suggesting that it takes knowledge of one's positive serostatus to evoke AIDS-specific optimism.<sup>7</sup>

#### *Optimism and Psychological Distress in HIV-Seropositive and HIV-Seronegative Men*

To examine the relationship between optimism and measures of psychological adjustment, coping, AIDS-related concerns, and risk-related sexual behavior, we used hierarchical regression analysis. The first three variables were entered into the equation in the following order: (a) age, (b) partner status, and (c) HIV serostatus.

The fourth step in the equation consisted of the variables related to optimism. In one set of analyses, AIDS-specific optimism and the fatalistic vulnerability measures were entered simultaneously as the fourth step. Both of these factors were included because of their conceptual relationship to the construct of interest, namely, optimism. In a second set of analyses, dispositional optimism, as assessed by the LOT, was entered as the fourth step. Finally, the interactions between HIV status and the optimism measures were entered in a fifth step. The interaction terms were entered last to control for the main effects of each interaction (see Cohen & Cohen, 1983). It should be noted that the correlation between dispositional optimism and AIDS-specific optimism is .18 ( $p < .05$ ).

What follows are the hierarchical regression analyses relating AIDS-specific optimism, fatalistic vulnerability, and dispositional optimism to psychological distress, AIDS-related worries and concerns, perceived risk of developing AIDS, perceived control over developing AIDS, coping, health behaviors, and AIDS risk-related sexual activity.

*Psychological distress.* The hierarchical model explained 9% of the variance in psychological distress when AIDS-Specific Optimism–Fatalistic Vulnerability was considered as a predictor. The only significant predictor of psychological distress was

the AIDS-Specific Optimism–Fatalistic Vulnerability step ( $\Delta R^2 = .07$ ,  $p < .00001$ ). Age, partner status, and HIV status alone failed to account significantly for variance in psychological distress, nor did the interaction of HIV status and optimism explain a significant amount of the variance. To determine the independent contributions of AIDS-Specific Optimism and Fatalistic Vulnerability to variation in psychological distress, the beta weights for each variable were evaluated. Those scoring higher on Fatalistic Vulnerability reported more psychological distress ( $\beta = .25$ ,  $p < .0001$ ), whereas AIDS-Specific Optimism was unrelated to distress.

When the LOT was considered as a predictor, the model explained 35% of the variance in psychological distress. The only significant predictor of psychological distress was dispositional optimism ( $\Delta R^2 = .34$ ,  $p < .0001$ ). No other variables explained a significant amount of the variance in psychological distress, nor did the interaction of HIV status and dispositional optimism.

*AIDS-related worries and concerns.* The hierarchical model including AIDS-Specific Optimism–Fatalistic Vulnerability explained 12% of the variance in the AIDS-related worries and concerns. HIV status was a significant predictor of worries ( $\Delta R^2 = .05$ ,  $p < .0001$ ), with men who were HIV seropositive scoring significantly higher on AIDS-related worries and concerns than men who were HIV seronegative. In addition, the AIDS-Specific Optimism–Fatalistic Vulnerability step significantly predicted AIDS-related worries and concerns ( $\Delta R^2 = .07$ ,  $p < .0001$ ), with those scoring higher on Fatalistic Vulnerability reporting more worries and concerns ( $\beta = .23$ ,  $p < .0001$ ); the AIDS-Specific Optimism variable was unrelated to AIDS-related worries and concerns.

Similar findings emerged on the analyses using dispositional optimism, with the model explaining 10% of the variance in AIDS-related worries and concerns. Again, HIV status was a significant predictor ( $\Delta R^2 = .05$ ,  $p < .0005$ ), as was the LOT ( $\Delta R^2 = .05$ ,  $p < .0005$ ), with those testing HIV seropositive and those lower in optimism expressing more worries and concerns. Age, partner status, and the interaction of HIV status with optimism were not significant predictors in either model.

*Perceived risk.* The hierarchical model explained 39% of the variance in perceived risk of developing AIDS when AIDS-Specific Optimism–Fatalistic Vulnerability was considered as a

<sup>6</sup> Men who were HIV seropositive but did not know their serostatus had lower scores on psychological distress (seropositive  $M = -.88$ ; seronegative  $M = .06$ ),  $t(148.5) = 2.05$ ,  $p < .05$ , and higher scores on Limit Sexual Partners (seropositive  $M = 1.72$ ; seronegative  $M = 1.40$ ),  $t(158) = -2.01$ ,  $p < .05$ , than those who did not know their serostatus and were seronegative. It is difficult to know whether these differences reflect anything meaningful, and if so, how to interpret them, because ostensibly all subjects were unaware of their HIV status.

<sup>7</sup> Although it might seem unusual for a man to choose not to know his serostatus, there is a likely explanation. At the time the serostatus data were initially collected, there were no treatments available, such as zidovudine (AZT), for men who knew they had been infected by the AIDS virus but had not yet developed AIDS. Consequently, a large percentage of the sample elected not to know their serostatus, because they felt there was nothing that could be done about it regardless of the test results. It should be noted that the majority of these men have now chosen to know their serostatus, because treatments are now available.

predictor. The analysis revealed a significant effect for HIV status ( $\Delta R^2 = .30, p < .0001$ ), such that those who were HIV seropositive saw themselves at greater risk than those who were HIV seronegative. In addition, there was a significant effect for the AIDS-Specific Optimism–Fatalistic Vulnerability step ( $\Delta R^2 = .08, p < .0001$ ). Those who were lower in AIDS-Specific Optimism ( $\beta = -.18, p < .01$ ) and higher in Fatalistic Vulnerability ( $\beta = .20, p < .0001$ ) saw themselves at greater risk. There was also an interaction between serostatus and optimism ( $\Delta R^2 = .02, p < .0004$ ). Specifically, AIDS-Specific Optimism was weakly related to perceived risk among the HIV-seronegative men (slope =  $-.10$ ) but was a strong predictor of lower perceived risk among HIV-seropositive men (slope =  $-.835$ ).

The hierarchical model explained 36% of the variance in perceived risk of developing AIDS when dispositional optimism was considered as a predictor. Again, both HIV status ( $\Delta R^2 = .31, p < .0001$ ) and the score on the LOT ( $\Delta R^2 = .03, p < .0005$ ) were significant predictors, with those positive for HIV and low in optimism seeing themselves at greater risk of developing AIDS than those testing negative for the HIV virus and those high in optimism. There was no interaction between optimism and HIV status in the dispositional optimism analysis.

*Perceived control.* The hierarchical model explained 39% of the variance in perceived control over AIDS when AIDS-Specific Optimism–Fatalistic Vulnerability was used as a predictor and 32% of the variance when dispositional optimism was considered as a predictor. The analyses for AIDS-Specific Optimism and dispositional optimism parallel each other closely, with HIV status, optimism, and the interaction between the two as significant predictors of perceived control.

Specifically, individuals who were HIV seropositive saw themselves as having less control over AIDS than those who tested HIV seronegative ( $\Delta R^2 = .24, p < .0001$  for the AIDS-Related Optimism–Fatalistic Vulnerability analysis;  $\Delta R^2 = .23, p < .0001$  for the LOT analysis). In addition, the AIDS-specific optimism–fatalistic vulnerability step significantly predicted perceived control ( $\Delta R^2 = .10; p < .0001$ ), such that those who scored high on AIDS-Specific Optimism ( $\beta = .25, p < .0001$ ) and those who scored low on Fatalistic Vulnerability ( $\beta = -.20, p < .0001$ ) saw themselves as having more control. In addition, those who scored high in dispositional optimism ( $\Delta R^2 = .06; p < .0005$ ) reported having more control than those who scored low in dispositional optimism.

The interactions between HIV status and the optimism variables were significant ( $\Delta R^2 = .05, p < .0001$  for AIDS-Specific Optimism–Fatalistic Vulnerability;  $\Delta R^2 = .01, p < .03$  for dispositional optimism). The interactions are very similar whether dispositional optimism or AIDS-Specific Optimism is used as a predictor. Specifically, optimism is a relatively poor predictor of perceived control among HIV-seronegative individuals, but a considerably stronger predictor for HIV-seropositive individuals. Among the HIV-seropositive men, those who scored high on optimism, whether dispositional or AIDS-specific, perceived themselves as having more control than those who scored low on optimism.

#### *Optimism and Coping in HIV-Seropositive and HIV-Seronegative Men*

The next analyses examined the relation of AIDS-Specific Optimism, Fatalistic Vulnerability, and dispositional optimism

to methods of coping with AIDS. The same hierarchical regression models were used.

*Positive Attitudes.* The hierarchical model explained 12% of the variance in the use of Positive Attitudes as a coping strategy when AIDS-Specific Optimism–Fatalistic Vulnerability was used as a predictor. Only HIV status ( $\Delta R^2 = .03, p < .0007$ ) and the optimism step ( $\Delta R^2 = .08, p < .0001$ ) were significant predictors. Specifically, men who were HIV seropositive made greater use of Positive Attitudes as a coping method than men who were HIV seronegative. Men who were high in AIDS-Specific Optimism ( $\beta = .19, p < .0001$ ) or low in Fatalistic Vulnerability ( $\beta = -.20, p < .0000$ ) used Positive Attitudes more.

A similar pattern emerged when dispositional optimism was included as a predictor. The hierarchical model explained 15% of the variance, and only HIV status ( $\Delta R^2 = .03, p < .005$ ) and dispositional optimism ( $\Delta R^2 = .10, p < .0001$ ) were significant predictors of Positive Attitudes.

*Personal growth–helping others.* The hierarchical model explained 9% of the variance in use of the Personal Growth–Helping Others coping factor when AIDS-Specific Optimism–Fatalistic Vulnerability was used as a predictor. Partner status ( $\Delta R^2 = .01, p < .04$ ) and the optimism step ( $\Delta R^2 = .07, p < .0001$ ) were significant predictors. Specifically, men with partners were more likely to cope using strategies involving Personal Growth–Helping Others, and those who were more optimistic ( $\beta = .21, p < .0001$ ) on the AIDS-Specific Optimism measure and less fatalistically vulnerable ( $\beta = -.15, p < .002$ ) were more likely to cope using Personal Growth–Helping Others. When dispositional optimism was included as a predictor, the hierarchical model explained 4% of the variance and only HIV status ( $\Delta R^2 = .02; p < .05$ ) was a significant predictor. Specifically, HIV-seropositive men were more likely to cope using Personal Growth–Helping Others than HIV-seronegative men.

*Seeking social support.* The hierarchical model using AIDS-Specific Optimism–Fatalistic Vulnerability as a predictor explained 3% of the variance in Seeking Social Support. Only the interaction between HIV status and optimism was significant ( $\Delta R^2 = .01; p < .05$ ). In particular, AIDS-Specific Optimism was not very related to support seeking among the HIV-seronegative men; in contrast, among the HIV-seropositive men, those high in AIDS-Specific Optimism were more likely to cope using Seeking Social Support than those low in AIDS-Specific Optimism. In the hierarchical model that used dispositional optimism as a predictor, there were no significant effects.

*Fatalism/self-blame/escape–avoidance.* The hierarchical model explained 11% of the variance in the use of Fatalism/Self-Blame/Escape–Avoidance when AIDS-Specific Optimism–Fatalistic Vulnerability was used as a predictor and 12% of the variance when dispositional optimism was used as a predictor. In both analyses, the only significant predictor was the optimism step. Specifically, those with greater Fatalistic Vulnerability ( $\beta = .29, p < .0001; \Delta R^2 = .09, p < .0001$  for the step) and those with less dispositional optimism ( $\beta = -.34, p < .0001; \Delta R^2 = .11, p < .0001$ ) were more likely to cope using Fatalism/Self-Blame/Escape–Avoidance. The AIDS-Specific Optimism variable was unrelated to this form of coping.

*Avoidance of AIDS.* The hierarchical model explained 10% of the variance in Avoidance of AIDS as a coping strategy when

AIDS-Specific Optimism–Fatalistic Vulnerability was used as a predictor. Avoidance of AIDS was practiced more by younger than by older men ( $\Delta R^2 = .01, p < .03$ ), more by HIV-seropositive men than by HIV-seronegative men ( $\Delta R^2 = .02, p < .005$ ), and more by those high in AIDS-Specific Optimism ( $\beta = .19, p < .0002$ ) and high in Fatalistic Vulnerability ( $\beta = .12, p < .02; \Delta R^2 = .05; p < .0001$ ). In addition, a significant interaction between HIV status and AIDS-Specific Optimism ( $\Delta R^2 = .02; p < .009$ ) revealed that, although HIV-seronegative optimists and pessimists did not differ in their use of Avoidance of AIDS as a coping strategy, HIV-seropositive optimists used Avoidance of AIDS more than men low in AIDS-Specific Optimism.

The hierarchical model explained 5% of the variance when dispositional optimism was used as a predictor. Only HIV status ( $\Delta R^2 = .03, p < .006$ ) was a significant predictor.

### *Does Coping Mediate the Relation Between Optimism and Psychological Distress?*

To understand better the relations between the optimism variables (AIDS-Specific Optimism, Fatalistic Vulnerability, and dispositional optimism) and psychological distress, AIDS-related worries and concerns, and perceived control, we examined whether the relationships were direct or mediated by coping strategies. That is, the optimism variables may themselves influence psychological distress, worry, and control, or they may reduce psychological distress because they are associated with the use of effective coping strategies. The criteria for mediation are that the predictor variable correlate with the proposed mediator and with the proposed outcome variable and that when the relation between the predictor and the mediator is controlled for, the relation between the predictor and the outcome variable is substantially reduced or eliminated.

To address mediation, we conducted regression analyses that entered the following variables in the following order: age and partner status as the first and second steps, HIV serostatus as the third step, all five coping factors as the fourth step, and the optimism step (AIDS-Specific Optimism–Fatalistic Vulnerability in one set of analyses and dispositional optimism in the other set of analyses) in predicting psychological distress, AIDS-related worries and concerns, and perceived control.

The results suggest that coping strategies may well explain the relation between fatalistic vulnerability and psychological distress. Specifically, the coping factors are a strongly significant predictor of psychological distress ( $\Delta R^2 = .29, p < .0001$ ), and when they are entered before fatalistic vulnerability, the relation between fatalistic vulnerability and psychological distress is no longer significant.

Hierarchical regression analyses suggest, however, that coping strategies may not fully mediate the relationship between fatalistic vulnerability and AIDS-related worries and concerns. Although the coping factors were a significant predictor of AIDS-related worries and concerns ( $\Delta R^2 = .08, p < .0001$ ), the relation between Fatalistic Vulnerability and AIDS-related worries and concerns remains significant, even after coping strategies are added to the equation ( $\Delta R^2 = .03, p < .004$ ).

Hierarchical regression analyses suggest that coping strategies largely mediate the relation of Fatalistic Vulnerability to perceived control. The coping strategies were a strong predictor of perceived control ( $\Delta R^2 = .13, p < .0001$ ), and when coping

strategies were added to the regression equation before Fatalistic Vulnerability, the relation of Fatalistic Vulnerability to perceived control was greatly reduced and no longer significant.

Because AIDS-Specific Optimism was not associated with psychological distress or with AIDS-specific worries and concerns, mediational analyses for these variables were not conducted. However, because of the significant relation between AIDS-Specific Optimism and perceived control, a hierarchical regression analysis was conducted to determine whether coping strategies mediate this relation. As previously noted, coping strategies are themselves a strong predictor of perceived control. However, with the addition of coping strategies in the hierarchical model including AIDS-Specific Optimism, AIDS-Specific Optimism continued to be a significant predictor of perceived control ( $\Delta R^2 = .02, p < .01$ ).

Because dispositional optimism was weakly related to only two of the coping strategies, mediational analyses to determine whether coping mediates the relation of dispositional optimism to psychosocial distress, AIDS-related worries and concerns, and perceived control were not conducted.

### *Optimism and Health Behaviors in HIV-Seropositive and HIV-Seronegative Men*

The next set of analyses examined the relation of AIDS-Specific Optimism–Fatalistic Vulnerability and dispositional optimism to the practice of health behaviors and high-risk sexual behavior. The same hierarchical regression models were used, except where otherwise noted.

*Health-promoting behavior.* The hierarchical model explained 20% of the variance in Health-Promoting Behavior when AIDS-Specific Optimism–Fatalistic Vulnerability was used as a predictor. The significant predictors were age ( $\Delta R^2 = .02, p < .01$ ), HIV status ( $\Delta R^2 = .15, p < .0001$ ), and AIDS-Specific Optimism–Fatalistic Vulnerability ( $\Delta R^2 = .03, p < .001$ ), with younger men, HIV-seropositive men, and AIDS-Specific Optimists ( $\beta = .17, p < .0002$ ) reporting practicing more Health-Promoting Behavior. Fatalistic Vulnerability was unrelated to the practice of these behaviors. In the hierarchical model using dispositional optimism as a predictor, 15% of the variance was explained. The only significant predictor was HIV status, again showing that seropositive men report practicing more health behaviors than seronegative men ( $\Delta R^2 = .12, p < .0001$ ).

*Limit social contact with gay and HIV-seropositive men.* The hierarchical model using AIDS-Specific Optimism–Fatalistic Vulnerability as a predictor explained 5% of the variance in Limiting Social Contact With Gay and HIV-Seropositive Men. Only one variable, AIDS-Specific Optimism–Fatalistic Vulnerability, was a significant predictor ( $\Delta R^2 = .04, p < .0002$ ). Those with high Fatalistic Vulnerability were more likely to Limit Social Contact With Gay and HIV-Seropositive Men than those low in fatalistic vulnerability ( $\beta = .21, p < .0001$ ). AIDS-Specific Optimism was unrelated to this behavior. The analysis using dispositional optimism as a predictor explained less than 1% of the variance in Limit Social Contact With Gay and HIV-Seropositive Men. There were no significant predictors.

*Limit sexual partners.* The hierarchical model explained 5% of the variance when AIDS-Specific Optimism–Fatalistic Vulnerability was considered as a predictor. Only one variable,



partner status, was a significant predictor, with men with a primary partner limiting the number of sexual partners they had more than men without a primary sex partner ( $\Delta R^2 = .03$ ,  $p < .0002$ ). In the analyses using dispositional optimism as a predictor, the hierarchical model explained 5% of the variance. Again, only partner status was a significant predictor ( $\Delta R^2 = .03$ ,  $p < .004$ ).

*Practice of safe sex.* The hierarchical model explained 4% of the variance in Practice of Safe Sex when AIDS-Specific Optimism–Fatalistic Vulnerability was considered as a predictor, and 3% of the variance when dispositional optimism was considered as a predictor. There were no significant predictors in either analysis.

The analyses just described drew on the questionnaire data we collected. The following analyses were conducted on the data collected by the parent project, the MACS Cohort Study, as part of their intensive interview that assessed sexual behavior confidentially.

### *MACS Interview Sexual Behavior Analyses*

To examine the relation between the measures of optimism and high-risk sexual behavior, we regressed three measures of sexual behavior separately on the predictors, following the same hierarchical procedures used in the preceding analyses. To reiterate, those three measures were number of sexual partners, number of anonymous sexual partners, and number of partners with whom one practiced anal receptive intercourse without a condom. The measures were assessed at two times, separated by a 6-month interval. For each measure of sexual behavior, the cross-sectional relationships between the optimism variables and high-risk sexual behavior were assessed in models predicting each sexual behavior at the first assessment. The prospective relationships between the optimism variables and high-risk sexual behavior were assessed in models predicting each behavior at the second assessment, controlling for prior behavior. The three measures of sexual behavior were analyzed separately because each has been identified as an independent risk factor for HIV infection (see, e.g., Darrow et al., 1987).

*Number of sexual partners.* Logarithmic transforms were made of the number of sexual partners at each assessment to reduce extreme negative skew in the distribution of these variables.

The cross-sectional hierarchical model explained 4.5% of the variance in the number of sexual partners at Time 1 when AIDS-Specific Optimism–Fatalistic Vulnerability was considered as a predictor. Partner status ( $\Delta R^2 = .02$ ,  $\beta = .13$ ,  $p < .007$ ) was a significant predictor of number of sexual partners, with men who reported not having a primary sexual partner reporting greater numbers of sexual partners during the 6-month interval. Additionally, the step involving AIDS-Specific Optimism–Fatalistic Vulnerability was significant ( $\Delta R^2 = .02$ ,  $p < .02$ ), with higher fatalism scores predicting fewer sexual partners ( $\beta = -.13$ ,  $p < .02$ ).

A prospective analysis was conducted to examine predictors of the number of sexual partners at Time 2, controlling for the number of partners at Time 1. This prospective model explained 57% of the variance in Time 2 sexual partners. As expected, the number of partners at Time 1 was a significant

predictor of the number of partners at Time 2 ( $\Delta R^2 = .57$ ,  $\beta = .75$ ,  $p < .0001$ ). Additionally, the step testing the interactions between HIV status and AIDS-Specific Optimism–Fatalistic Vulnerability was significant ( $\Delta R^2 = .01$ ,  $p < .05$ ), with the interaction between HIV status and Fatalistic Vulnerability reaching significance ( $\beta = .26$ ,  $p < .05$ ). Specifically, among HIV-seropositive men, Fatalistic Vulnerability predicted greater numbers of sexual partners (slope = .114), whereas among HIV-seronegative men, Fatalistic Vulnerability predicted fewer sexual partners (slope =  $-.116$ ).

The cross-sectional hierarchical model explained 3% of the variance in the number of sexual partners at Time 1 when dispositional optimism was considered as a predictor, and no steps were significant. The prospective model controlling for the number of sexual partners at Time 1 explained 57% of the variance in number of partners at Time 2, with the number of partners at Time 1 as the only significant predictor ( $\beta = .75$ ,  $p < .0001$ ).

*Number of anonymous sexual partners.* We made logarithmic transforms of the number of anonymous partners at each assessment to reduce extreme negative skew in the distribution of these variables.

A cross-sectional model predicted 3% of the variance in the number of anonymous partners when AIDS-Specific Optimism–Fatalistic Vulnerability was considered as a predictor. Significant coefficients for age ( $\Delta R^2 = .01$ ,  $\beta = .11$ ,  $p < .03$ ) and partner status ( $\Delta R^2 = .01$ ,  $\beta = .12$ ,  $p < .02$ ) indicated that older men and men without primary partners reported greater numbers of anonymous sexual partners at Time 1.

A prospective analysis was conducted to examine predictors of the number of anonymous partners at Time 2, controlling for the number of partners at Time 1. This model accounted for 58% of the variance. The number of anonymous partners at Time 1 ( $\Delta R^2 = .56$ ,  $\beta = .76$ ,  $p < .04$ ) and not having a primary partner ( $\Delta R^2 = .005$ ,  $\beta = .07$ ,  $p < .04$ ) predicted greater numbers of anonymous partners at Time 2.

The cross-sectional model explained 3% of the variance when dispositional optimism was considered as a predictor. Again, men without a primary partner reported significantly more anonymous sexual partners ( $\Delta R^2 = .02$ ,  $\beta = .13$ ,  $p < .05$ ). The prospective model controlling for the number of anonymous partners at Time 1 explained 59% of the variance in the number of partners at Time 2, with the number of partners at Time 1 as the only significant predictor ( $\Delta R^2 = .57$ ,  $\beta = .76$ ,  $p < .0001$ ).

*Number of partners for unprotected anal receptive intercourse.* Because only 15% of the sample reported engaging in unprotected anal receptive intercourse, linear regression could not be performed on this behavior. Instead, we divided the sample into two groups at each assessment. Men who did not practice this behavior over the 6-month interval or who did so exclusively with a primary partner known to be HIV seronegative were classified as “safe” ( $n = 332$  at Time 1;  $n = 327$  at Time 2).<sup>8</sup> Men who practiced anal receptive intercourse without a

<sup>8</sup> Because of missing data from the parent study on partner HIV status, the number of cases for analyses involving risky versus safe unprotected anal receptive intercourse is smaller than for the analyses of number of sexual partners overall and number of anonymous partners.

condom with more than one partner or who practiced this behavior with a primary partner who was HIV seropositive or whose serostatus was unknown were classified as "risky" ( $n = 39$  at Time 1;  $n = 44$  at Time 2). To determine the relation between optimism and the practice of "safe" versus "risky" unprotected anal receptive intercourse, we conducted a hierarchical logistic regression.

A cross-sectional model using AIDS-Specific Optimism-Fatalistic Vulnerability as a predictor of risky unprotected anal receptive intercourse revealed two effects. Age, which accounted for less than 1% of the variance, was a significant predictor of the presence of this behavior ( $\beta = -.06, SE = .03, p < .05$ ), such that older men were less likely to report the presence of partners for unprotected anal receptive sex. Additionally, HIV status accounted for another 1% of the variance ( $\beta = .34, SE = .17, p < .05$ ), such that HIV-seropositive men were more likely to report the presence of partners for unprotected anal receptive sex than were HIV-seronegative men. A prospective model controlling for risky unprotected anal receptive intercourse at Time 1 revealed significant effects of age ( $\beta = -.06, SE = .027, p < .04$ ), which again accounted for less than 1% of the variance, and the presence of partners for unprotected anal receptive sex at Time 1 ( $\beta = 1.05, SE = .19, p < .0001$ ), which accounted for 11% of the variance in the presence of partners for risky unprotected anal receptive intercourse at Time 2.

A cross-sectional hierarchical model using dispositional optimism as a predictor revealed that HIV status was the only significant predictor of the presence of partners for unprotected anal receptive intercourse ( $\beta = .45, SE = .22, p < .04$ ), accounting for 1.5% of the variance. As in the previous analysis, men who were HIV seropositive were more likely to report engaging in unprotected anal receptive sex than men who were HIV seronegative. A prospective model controlling for risky unprotected anal receptive sex at Time 1 revealed that Time 1 behavior ( $\beta = 1.30, SE = .24, p < .0001, R^2 = .16$ ) and HIV status ( $\beta = .51, SE = .23, p < .03, R^2 = .02$ ) were the only significant predictors in the practice of risky unprotected anal receptive intercourse at Time 2. The significant coefficient for HIV status indicates that men who were HIV seropositive were more likely to report practicing this behavior than men who were HIV seronegative, controlling for prior behavior. A summary of all the regression analyses appears in Table 2.

Discussion

Evidence of Illusion

Previous research has found that many people respond to threatening events by developing illusions about their personal attributes, their degree of control over events around them, and the degree to which the future holds positive outcomes (Taylor, 1983, 1989; Taylor & Brown, 1988). The men at risk for AIDS in this investigation appear to show such illusions. Many respondents reported attitudes and beliefs that reflect an underlying perception of invulnerability to AIDS that might be considered at least somewhat unrealistically optimistic. They believe that they are safe from AIDS because they have probably developed an immunity. They believe that they can eliminate the virus from their system and that their immune systems are better able to accomplish this than those of other gay men. They be-

Table 2  
Summary of Hierarchical Regression Results Relating Optimism Variables to Psychological Distress, Coping, and Behavior

Variable	AIDS-Specific Optimism	Fatalistic Vulnerability	Dispositional optimism
Psychological distress	0	+	-
AIDS-related worries and concerns	0	+	-
Perceived risk	- <sup>a</sup>	+	-
Perceived control	+ <sup>a</sup>	-	+ <sup>a</sup>
Positive Attitudes	+	-	+
Personal Growth-Helping Others	+	-	0
Seeking Social Support	+ <sup>b</sup>	0	0
Fatalism/Self-Blame/Escape-Avoidance	0	+	-
Avoidance of AIDS	+ <sup>a</sup>	+	0
Health-Promoting Behavior	+	0	0
Limit Social Contact with Gay and HIV-Seropositive Men	0	+	0
Limit Sexual Partners	0	0	0
Practice of Safe Sex	0	0	0
Number of sexual partners	0/0 <sup>c</sup>	-/+ (for HIV+) -/- (for HIV-)	0/0
Number of anonymous sexual partners	0/0	0/0	0/0
Number of partners for unprotected anal receptive sex	0/0	0/0	0/0

Note. 0 denotes not significant; + denotes significant positive association; - denotes significant negative association; AIDS = acquired immunodeficiency syndrome; HIV = human immunodeficiency virus. <sup>a</sup> Primarily for HIV-seropositive men (both the main effect and interaction with HIV serostatus were significant). <sup>b</sup> Primarily for HIV-seropositive men (only interaction with HIV serostatus was significant). <sup>c</sup> Refers to two time periods, concurrent and predictive.

lieve that staying healthy and in good physical condition can prevent the development of AIDS.

Perhaps the most dramatic evidence for the prevalence of illusions is the fact that the men who have already tested seropositive for the HIV virus are actually more optimistic about not developing AIDS than the men who have tested seronegative for the HIV virus. Inasmuch as being HIV seropositive is the chief risk factor for developing AIDS, the prevalence and strength of these beliefs among the seropositive men in this sample is somewhat startling. Our work has suggested that, whereas illusions of invulnerability may be generally adaptive and protect people from the minor negative experiences of

daily life (Taylor, 1989; Taylor & Brown, 1988), illusions may become especially important and exaggerated in people facing severe threats as a method of dealing with the threat. The difference in AIDS-Specific Optimism between the seropositive and seronegative men in their beliefs concerning invulnerability to AIDS is consistent with this point.

An interpretational issue arises as to whether the seropositive sample became more optimistic about not developing AIDS than the seronegative sample as a response to testing positive, or whether they were a more optimistic group to begin with. It is conceivable that optimistic people are more outgoing and attractive as potential sexual partners, which may place them at greater risk for becoming seropositive. This would render seropositivity a result of AIDS-Specific Optimism, rather than the reverse. To investigate this possibility, we looked at the optimism scores of those men who had tested positive and negative for the AIDS virus but who had chosen not to become aware of their serostatus. Among those unaware of their serostatus, there are no differences between the seropositive individuals and the seronegative individuals on either AIDS-Specific Optimism or dispositional optimism, suggesting that *knowledge* of one's HIV status may be necessary to produce the difference in AIDS-Specific Optimism between the HIV-seropositive and the HIV-seronegative men. These findings weaken the argument that seropositivity is a result of optimism.

Of perhaps greater relevance, however, is the fact that, at the time that most of these men became seropositive, the HIV virus had not been discovered, AIDS had not been labeled, and modes of transmission of the disease were unknown.<sup>9</sup> Thus, there was no construct of AIDS-specific optimism that could have led to greater chances for seropositivity. Had dispositional optimism differed between the two groups, this reverse direction of causality would be more credible, but as noted above, it did not. These points lend credibility to the argument that discovering one is seropositive boosts specific optimism about not developing AIDS and that AIDS-specific optimism does not produce a higher risk for seropositivity.

### *Optimism, Coping, and Adjustment*

The cognitive adaptation model (Taylor, 1983, 1989) maintains that positive illusions develop because they are successful coping techniques for dealing with severe threats. Similarly, Scheier and Carver (1985) have regarded dispositional optimism as a stable coping resource. The results are generally consistent with these perspectives, although they provide a somewhat more differentiated picture than that of a simple optimism-adjustment relationship.

Similar to previous research (Scheier, Weintraub, & Carver, 1986), dispositional optimism was associated with lower psychological distress, fewer worries and concerns about AIDS, a perceived lower risk of AIDS, a higher degree of control over AIDS, and more active coping strategies. AIDS-specific optimism was associated with lower perceived risk, higher perceived control over AIDS, the use of positive attitudes, Personal Growth-Helping Others, and Avoidance of AIDS as coping strategies, and with the reported practice of health behaviors for both seropositive and seronegative men. However, AIDS-Specific Optimism also appears to evolve and moderate AIDS-specific cognitions and coping more among the seropositive

men than the seronegative men. For example, seropositive men high in AIDS-Specific Optimism reported more Seeking of Social Support and more Avoidance of AIDS than seropositive men low in AIDS-Specific Optimism, whereas AIDS-Specific Optimism had no moderating effect on these variables for seronegative men. AIDS-Specific Optimism similarly interacts with serostatus for perceived risk of and perceived control over AIDS.

What do we conclude about the psychological correlates of optimism? Dispositional optimism may reduce the likelihood of demoralization or overriding fears and promote active coping efforts to influence the threat. As such, our results for dispositional optimism are consistent with a growing body of literature suggesting that it is an important coping resource. In addition, AIDS-Specific Optimism, cognitions specifically related to the AIDS situation, appears to serve similar psychological functions, but more for the seropositive than the seronegative men. Recent conceptually related research concerning self-efficacy (Bandura, 1986) and psychological control (Folkman, 1984; Wallston, Wallston, & DeVellis, 1978) has suggested the importance of assessing not only dispositional expectations but also situation-specific expectations when attempting to predict cognitions, emotions, and behavior in response to stressful situations. The differences between AIDS-Specific Optimism and dispositional optimism found in this study suggest that this distinction may also be important for optimism.

Moreover, the distinction between dispositional and situation-specific optimism suggests that it may be possible to untangle the psychologically adaptive effects of optimism from the overlap that dispositional optimism may share with measures of negative affectivity or neuroticism (e.g., Smith, Pope, Rhodewalt, & Poulton, 1989). Specifically, because of the absence of a correlation between AIDS-Specific Optimism and psychological distress, and because AIDS-Specific Optimism appears to arise in response to the threat of AIDS, as opposed to being a stable dispositional style, the patterns of results suggest that AIDS-Specific Optimism may be less contaminated by these potential sources of response bias.

### *Fatalistic Vulnerability*

Fatalistic vulnerability about AIDS produced a pattern of results similar to that of dispositional optimism, although in the opposite direction. Men high in fatalistic vulnerability were more distressed, had more AIDS-related worries and concerns, perceived themselves to be at greater risk, and perceived themselves as having lower degrees of control over AIDS than those low in fatalistic vulnerability. In addition, they were less likely to make use of active coping strategies, such as positive attitudes and personal growth-helping others, and more likely to make use of avoidant coping strategies, namely fatalism/self-blame/escape-avoidance and avoidance of information about AIDS.

<sup>9</sup> It should be noted that in the MACS study, blood was drawn from the participants at the inception of the study and the samples were frozen for later analyses. When the HIV virus was discovered and a test was available for antibodies against HIV, these samples were thawed and the HIV status of these individuals was then determined. At the time the blood was initially drawn, the serostatus of the men was unknown, because the HIV antibody test was not yet available.

They were more likely to limit their social contact with the gay community and with HIV-seropositive men and to have fewer sexual partners overall, although among seropositive men high in fatalistic vulnerability, there was a trend toward more sexual partners.

What is the conceptual status of fatalistic vulnerability? Our current suspicion is that fatalistic vulnerability about AIDS may represent an AIDS-specific manifestation of negative affectivity or a conceptually related state. First, it behaves like a dispositional variable, mirroring the pattern of dispositional optimism rather than AIDS-specific optimism. With the exception of number of sexual partners, it shows no interactions with serostatus on the other dependent variables. Second, all the variables with which it covaries most strongly are similarly marked by a negative orientation. Future work is needed to confirm or disconfirm this suspicion.

Regardless of the conceptual status of fatalistic vulnerability, the results suggest that the men who are high on this variable are very distressed. They believe that nothing can be done to prevent the spread of AIDS or that only very extreme measures such as abstaining from sexual activity can prevent its spread. They believe that being HIV seropositive means a person will definitely develop AIDS. These individuals, in contrast to those who evidence optimism, report more hopelessness and negative mood and more fears of developing AIDS. They are less active in dealing with thoughts of developing AIDS and are more fatalistic, self-blaming, and passive in their use of coping strategies. This group may be at risk for mental health problems. In addition, this form of helplessness, hopelessness, and passivity may be associated with health changes, given studies suggesting adverse relationships among depression, hopelessness, passive coping strategies, and health (see Peterson & Bossio, 1991, for a review). Thus, interventions among persons at risk for AIDS might fruitfully be targeted to these individuals.

### *Mediation of Effects*

We examined whether fatalistic vulnerability is related to psychological distress, AIDS-related worries and concerns, and perceived control over AIDS directly, or whether fatalistic vulnerability is associated with less successful coping strategies that, in turn, affect distress, worry, and perceived control. No uniform pattern emerged. The association of fatalistic vulnerability with increased distress and low perceived control appeared to be mediated by coping strategies, in particular, the nonuse of active coping strategies and the use of passive avoidant coping strategies. Apparently, the coping strategies used by these men either were unsuccessful in reducing psychological distress or may actually have increased it. In a puzzling deviation from this pattern, however, the relation of Fatalistic Vulnerability to increased worry and concern about AIDS did not appear to be mediated by coping strategies.

AIDS-Specific Optimism was unrelated to psychological distress and to AIDS-related worries and concerns, so mediation issues could not be addressed for these variables. The relation of AIDS-Specific Optimism to higher perceived control does not appear to be mediated strongly by the use of coping strategies.

Overall, dispositional optimism affected psychological distress but not coping. In contrast, AIDS-Specific Optimism was

related to coping, but not to distress. Fatalistic Vulnerability was related to both coping and distress, and there was some evidence that coping strategies mediated the relation between Fatalistic Vulnerability and increased distress. In summary, however, there is very little evidence for the mediation of the effects of optimism-related variables on psychological adjustment, which is surprising in the light of previous work (Scheier et al., 1986, 1989).

### *Optimism, Fatalistic Vulnerability, and Health Behaviors*

Previous theories have generated conflicting predictions regarding the relationship of optimism to health behaviors, with some researchers suggesting that optimism may facilitate such constructive behavior (Scheier & Carver, 1985; Taylor & Brown, 1988), and others suggesting that unrealistic optimism may compromise self-protective behavior (e.g., Weinstein, 1984). In the case of self-reported health behaviors, this prediction was directly disconfirmed. On behaviors such as maintaining a proper diet, getting enough sleep, and exercising, the men high in AIDS-Specific Optimism reported practicing more of these behaviors than those low in AIDS-Specific Optimism.<sup>10</sup> In terms of sexual behavior, there was no evidence that optimism was associated with sexual behavior related to AIDS risk. Regardless of serostatus, the optimistic men were as likely as the less optimistic men to engage in low-risk sexual activity. Thus, the suggestion made by Weinstein (1982) that optimism may undermine effective health behaviors is not supported by these data.

We suggest that the design of the present study provided a particularly stringent test of the effects of optimism on high-risk sexual behavior. The study involved two assessments of optimism, one of dispositional optimism and one of AIDS-specific optimism. We know of no other study that has examined both dispositional and situation-specific optimism, and as previously noted, expectancy researchers have underscored the need to examine situation-specific as well as dispositional expectations (e.g., Bandura, 1986). Second, we included eight measures of high-risk sexual behavior, which together encompass two different methods (questionnaire and interview), two different research teams (us and the MACS cohort study researchers), and two different points in time (concurrent and 6 months later). There was virtual total consistency across the analyses relating both types of optimism to all eight measures of high-risk sexual behavior, and that was to find no health-compromising effects of optimism. For fatalistic vulnerability, there was a modest effect, such that those high in fatalistic vulnerability had fewer sexual partners, but there was no similar effect on higher risk sex, namely, numbers of anonymous partners and the practice of unprotected anal receptive intercourse. Thus, we feel that the design of the study gave us a good opportunity to find that optimism would compromise health behavior, and no such effects were uncovered.

<sup>10</sup> It should be noted that men at risk for AIDS are typically urged by physicians to stay healthy but are not explicitly told that getting enough sleep, maintaining a proper diet, and obtaining exercise will reduce their risk of developing AIDS.

### *Seropositive and Seronegative Men Compared*

We had expected that HIV-seropositive and HIV-seronegative men might show somewhat different relations of optimism to affect, worry, and coping, given the differences in stressors with which they are coping. Specifically, the seropositive men are coping with the risk of developing AIDS, whereas the seronegative men are dealing with changes in lifestyle and other stressors, but not with the immediate threat of developing AIDS. One might also have expected to see different relations of optimism to sexual behavior in the two groups, given the differences in what high-risk sexual behavior may mean to them. Some seropositive men, for example, may no longer see much personal advantage in practicing safe sex.<sup>11</sup> The seronegative men, in contrast, have more to lose, and if there are health-compromising effects of optimism, they would be most clearly related to risk in this group.

Despite the differences in the stressors with which they are dealing, the relations of dispositional optimism to coping, worries, health behaviors, and high-risk sexual behaviors are very similar in the two groups. The HIV-seropositive men have more AIDS-related worries and concerns and see themselves as at greater risk for AIDS than the HIV-seronegative men. At the same time, however, they see themselves as having more control over the development of AIDS, and they are more optimistic about not developing AIDS. They are also somewhat more likely to practice Positive Attitudes in coping with AIDS and to avoid thinking about or exposing themselves to reminders of AIDS. Finally, they are more likely to practice health-promoting behaviors. The other main difference between the HIV-seropositive and HIV-seronegative men, which has already been noted, is that AIDS-specific optimism appears to bear a stronger relation to coping strategies, perceived risk, and perceived control over AIDS in the seropositive men than in the seronegative men.

One pattern of seemingly paradoxical results merits explanation. On the one hand, the HIV-seropositive men have higher levels of AIDS-specific optimism than the seronegative individuals, yet they also see themselves to be at greater risk of developing AIDS, have higher levels of AIDS-related worries and concerns, and see themselves as having less control over AIDS. The conceptual analysis of positive illusions (Taylor, 1989) provides some hints as to how these beliefs may simultaneously exist in the same sample. Positive illusions are judged to be discriminably different from the defense mechanisms of repression and denial. Repression and denial are thought to increase, the greater the degree of threat experienced (Weinberger, 1990; see Taylor, 1989, for a discussion of this issue). In contrast, examination of positive illusions among the chronically and terminally ill reveals that perceptions of one's situation covary directly with objective information about one's status (Taylor, 1989). That is, for example, patients with a poor prognosis or worsened health are aware of this fact without it eliminating their ability to experience feelings of control or optimism about their ability to, if not overcome, at least manage their responses to their disorders. Thus, the men who are seropositive are well aware of their status, are concerned about the possibility of developing AIDS, know that they are at great risk of developing AIDS, and perceive themselves as having less control over AIDS than do the seronegative men. Their beliefs that their

immune system is better able to ward off the adverse effects of the virus, and that they may eventually be able to avoid AIDS altogether, may come from the fact that they are practicing better health behaviors and making more active coping efforts than the seronegative men. It may be precisely because they have evolved these coping techniques that they can be optimistic in the face of the higher risk of AIDS that they acknowledge.

The question arises as to what will happen if these men go on to develop AIDS, as research suggests many, if not most of them, will. Will they be shattered by their disconfirmed beliefs in their ability to overcome the virus, or will they be able to accommodate as well or better than the men who did not hold these unrealistically optimistic beliefs? At present, we have no answer to this question. Given that the seropositive optimists as well as pessimists readily acknowledge their risk and AIDS-related worries and concerns, it seems unlikely that they will be greatly surprised if they subsequently develop the symptoms of AIDS. Moreover, inasmuch as optimism has been consistently associated with superior coping in our own study, as well as in the previous literature, it may be that the optimists will simply shift their expectations to accommodate the new reality (see Taylor, 1983, 1989, for discussions of this point). On the other hand, they may suffer disappointment that their coping efforts have failed them. The relative adjustments of the optimistic versus pessimistic seropositive men in the face of AIDS, then, is an important question that must await further evidence.

### *Limitations and Conclusions*

Some limitations of the present study should be noted. The sample is largely white, well educated, and middle class, and therefore these results may not generalize to populations that differ on these attributes. The results concern only gay men at risk for AIDS and may not be applicable to other populations at risk for AIDS, such as intravenous drug abusers or heterosexually active men and women. This study explores only certain types of health-compromising behaviors, albeit ones clearly tied to AIDS risk. Nonetheless, the results provide beginning evidence that the potential liabilities of optimism that have most concerned researchers may not be as serious as some have assumed.

<sup>11</sup> It should be noted, however, that maintaining high-risk sexual behavior may be a health threat to seropositive as well as seronegative men. There is now evidence that there are a number of different strains of the HIV virus, and continued high-risk sexual activity may expose even HIV seropositive men to more virulent strains of the virus, thus hastening the development of AIDS. Also, exposure to other sexually transmitted diseases, which could occur through these same high-risk behaviors, is believed to promote HIV progression. Many seropositive men are aware of this possibility.

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