

# Pathways of Risk: Race, Social Class, Stress, and Coping as Factors Predicting Heterosexual Risk Behaviors for HIV Among Women

Jeannette R. Ickovics,<sup>1,2,7</sup> Susan E. Beren,<sup>2,3</sup> Elena L. Grigorenko,<sup>2</sup> Allison C. Morrill,<sup>2,4</sup> Jennifer A. Druley,<sup>2,5</sup> and Judith Rodin<sup>2,6</sup>

Received December 22, 2000; revised April 4, 2002; accepted April 10, 2002

African-American women and Latinas as well as women of lower socioeconomic status are disproportionately represented among women with AIDS; therefore, understanding the factors associated with HIV risk behavior for these women is of particular concern. With a diverse sample of women, the current study examined the validity of a theoretical model that proposed that stress and coping mediated the relationships of race/ethnicity and social class to sexual risk behaviors. Structural equation modeling indicated that although social class demonstrated direct and indirect associations with HIV risk behavior, race did not. Women with lower income had higher levels of stress and riskier sexual partners. However, women with higher income were more likely to engage in unprotected intercourse, often within a committed relationship. Coping style did not mediate the relationship of race, social class, and/or stress with risky sexual behaviors. These findings indicate that social class may be a more important factor than race in predicting individual HIV risk behaviors and that assumptions about race and social class must be empirically tested to understand these complex associations. Pathways to risk and prevention are discussed.

**KEY WORDS:** HIV/AIDS; behavior; risk; social class; race; stress; coping.

## INTRODUCTION

AIDS prevention literature often asserts the need for *culturally sensitive* prevention strategies that

<sup>1</sup>Department of Epidemiology and Public Health, Yale University, and Center for Interdisciplinary Research on AIDS, New Haven, Connecticut.

<sup>2</sup>Department of Psychology, Yale University, New Haven, Connecticut.

<sup>3</sup>Present address: Beth Israel Medical Center and Department of Psychiatry, Albert Einstein College of Medicine, Bronx, New York.

<sup>4</sup>Present address: Northeastern University, Boston, Massachusetts.

<sup>5</sup>Present address: Cleveland State University, Cleveland, Ohio.

<sup>6</sup>Present address: University of Pennsylvania, Philadelphia, Pennsylvania.

<sup>7</sup>Correspondence and requests for reprints should be directed to Dr. Jeannette R. Ickovics, Department of Epidemiology and Public Health, Yale University, P.O. Box 208034, 60 College Street, New Haven, Connecticut 06520-8034; e-mail: Jeannette.Ickovics@Yale.edu.

address the specific needs of minority women. Women of color are disproportionately represented among women with AIDS, with African-Americans accounting for 57.7% and Latinas accounting for 19.8% of all women with AIDS (Centers for Disease Control and Prevention, 2001). Recent evidence suggests that the relative risk for AIDS is seven times greater for Latina women than for White women (Klevens *et al.*, 1999). Therefore, understanding HIV risk behaviors among women of color has been of particular concern (e.g., Cornelius *et al.*, 2000; Fernandez, 1995; Ickovics and Rodin, 1992; Jemmott *et al.*, 1995; Shain *et al.*, 1999; Soler *et al.*, 2000; Wohl *et al.*, 1998).

In general, researchers have proffered many explanations for the HIV risk of minority women: feelings of powerlessness that lead to the experience of helplessness, a short-term view of the world and of the consequences of behavior due to a more violent and chaotic environment, higher rates of prostitution

due to economic strain, and denial of vulnerability to AIDS risk (Amaro, 1995; Aral and Wasserheit, 1995; De La Cancela, 1989; Mays and Cochran, 1988; Worth, 1990). However, the impact of ethnically determined gender roles on sexuality and the negotiation of safer sex has received limited empirical attention (Amaro, 1995; Ickovics *et al.*, 2000). Ethnically determined values can influence perceptions of HIV, attitudes toward high-risk behavior, norms of behavior, and the potential for behavioral change (de Bruyn, 1992; Faryna and Morales, 2000; Fee and Krieger, 1993; Gupta and Weiss, 1993; Jemmott *et al.*, 1995). Cultural values in the African-American community emphasize family structure, gender relations, and social and economic survival, and these must be considered in the context of sexism, racism, and economic oppression (Jemmott *et al.*, 1995; Tesh, 1988). Within the Latino culture, *machismo* and *marianismo* appear to institutionalize male dominance and female subordination, and in a culture where a woman's social identity is determined by her fertility, any contraception may pose a threat to her status (Russell *et al.*, 2000; Torres, 1998). Cultural, racial, and ethnic stereotypes and expectations are generally well articulated. However, there are few studies that provide empirical evidence to support these statements.

Fernandez (1995) emphasized that some of these stereotypes are outdated, and that broad generalizations about racial or ethnic groups have been derived in part from clinical samples that do not account for important cultural mediators such as education, geography, and social class. It is well established that imbalances in economic situations, and thus also in power, equality, and control, have an adverse impact on women's health (Rodin and Ickovics, 1990). It is difficult to disentangle culture from socioeconomic factors when examining issues for women at risk for HIV in the United States. Poverty rates among African-Americans and Latinos are 26.1% and 25.6%, respectively, compared to a poverty rate of 10.5% among Whites (U.S. Census Bureau, 2000).

Some have suggested that the impoverished lives of many minority women may hinder their practice of safer sex: Poor minority women may be overwhelmed by the number of life stressors they experience, and AIDS risk may be of relatively low concern when compared to the need for shelter, food, employment, and safety that demand immediate attention (Mays and Cochran, 1988; Worth, 1990; Wyatt, 1994; Zierler and Krieger, 1997). The stress that many poor minority women experience, and the manner

with which they cope with that stress, may be related to AIDS risk behaviors.

The objective of this study was to examine a model of HIV sexual risk specifically designed to understand the effect of the stressful lives of poor minority women. Wyatt (1994) asserted that models of sexual risk generally have not been developed with adequate samples of ethnic minorities and persons diverse in sexual histories and lifestyles. In particular, these models have not adequately addressed sexual risk behaviors among women, especially those of ethnic minority and low-income populations. Moreover, models of sexual risk are generally cognitive and assume that the threat of HIV supersedes other problems. These models do not recognize that in certain life circumstances, the need for survival or current severe stress may transcend the fear of HIV (Wyatt, 1994).

This study evaluated the multivariate relationships among race/ethnicity, social class, stress, coping, and HIV-related heterosexual risk behaviors. Although the literature has not examined these factors collectively, there is a body of research that suggests strong associations. Significant relationships have been found among: (1) race, social class, and HIV risk behaviors; (2) race, social class, and stress; and (3) stress, coping, and health behaviors including HIV risk. Each of these will be considered in turn.

A small body of research suggests that being a member of a minority group and low social class are associated with sexual risk behaviors (Becker *et al.*, 1998; Schilling *et al.*, 1991). These studies, however, have not clarified how race and poverty may interact to influence HIV risk behaviors. Additionally, they have not proposed a model to understand the associations among race, social class, and risk. Possible mediating variables, such as stress and coping, have not been empirically explored.

Prior research indicated that higher levels of stress are associated with being a member of a minority group and with low social class (Dohrenwend, 1998; McEwen, 1998; Saldana, 1994). However, the differential effects of race and social class on stress have been a source of debate. Some have asserted that race is a key determinant of stress, that minority individuals experience significantly more frequent and severe daily hassles than nonminorities (Jung and Khalsa, 1989). Others have concluded that race is not an independent determinant of stress, but has served as a proxy for social class. In a review of this literature, Kessler and Neighbors (1986) argued that investigators have overlooked the *interaction* between race and social class in predicting stress; reanalyzing results

from previous studies, they found that race differences in stress were particularly pronounced in people of low social class.

Stress has also been associated with maladaptive health behaviors (e.g., Alexander and Hadaway, 1982; Finn *et al.*, 1987; Pohorecky, 1981; Sher, 1987; Stone *et al.*, 1985). Several studies suggest a link between stress and risky sexual behavior among men who have sex with men (Rosario *et al.*, 1996; Vincke *et al.*, 1993). In addition, perceived stress and adverse life circumstances (e.g., familial disruption, economic hardship, crime) have been associated with high-risk sexual behaviors among adolescents (Rotheram-Borus *et al.*, 1991; Stiffman *et al.*, 1995; Walter *et al.*, 1991). Some have interpreted certain maladaptive health behaviors as coping strategies to manage stress (Aldwin, 1994; Alexander and Hadaway, 1982; Lazarus and Folkman, 1984; Stone *et al.*, 1985; Wills *et al.*, 2001).

Coping was first suggested to be related to HIV risk in a study that found that risky sexual behavior was related to gay men's self-reports of having sex to relieve tension (McKusick *et al.*, 1985). Subsequent research has indicated that passive coping styles used to manage stress were positively related to actual and intended sexual risk behaviors, whereas active coping strategies were negatively related to sexual risk behaviors (Folkman *et al.*, 1992; Stein and Nyamathi, 1999). In a sample of African-American homeless women, Nyamathi (1992) found that women with high risk for HIV reported significantly more emotion-focused coping (i.e., passive versus active/problem-focused coping) and more severe life stress than women with moderate or low risk. However, because this study defined "high risk" only by injection drug use, one cannot draw conclusions regarding the influence of stress and coping on sexual risk behaviors.

In summary, the empirical literature suggests that race and social class may influence sexual behaviors, that race and social class are associated with stress, and that stress and coping are related to sexual risk. It is important to note that the majority of research examining the effect of stress and coping on sexual risk behaviors has focused on men who have sex with men. The effect of these factors on women's sexual risk has been neglected, and the specific types of stress that may be most relevant to impoverished, minority women have not been adequately explored. One cannot assume that results from studies of gay men are generalizable to women (Ickovics and Rodin, 1992).

The current study examined how race, social class, stress, and coping influence sexual risk

behavior in a diverse sample of women. Based on well-established psychological literature reviewed here, we proposed and tested a new theoretical model suggesting that the key factor linking race and social class to risky sexual behaviors was stress (Figure 1). We predicted that minority status (i.e., African-American and Latina) and low social class (defined by income and education) would lead to higher levels of stress. In turn, stress would lead to higher risk sexual behavior. We also predicted that coping style would mediate the association between stress and risky sexual behavior. Specifically, those with more-active coping techniques would be protected from the adverse influence of stress on sexual risk behavior.

## METHODS

### Study Participants

Study participants were recruited from four urban community-based public health clinics in New Haven, Connecticut. Participants were recruited from among women voluntarily seeking HIV counseling and testing (C&T) and a comparison group of never-tested women using other clinical services (e.g., primary care). Women were excluded only on the basis of pregnancy, as being pregnant may influence sexual behavior. As a group, the women in the study sample were representative of all women seen at these health clinics with regard to demographic factors (e.g., age, income, race/ethnicity) and accurately reflected the composition of the communities that these clinics serve (Ryan, 1997). Participants were taking part in a larger study examining the effects of HIV C&T on women's attitudes and behaviors (Ickovics *et al.*, 1994, 1998; Morrill *et al.*, 1996).

### Procedure

Study participants were recruited sequentially at each site. After their clinic appointment, women were given basic information about the study and invited to participate. Seventy-nine percent of eligible women agreed to participate; those who declined participation cited time constraints as the primary reason. Trained interviewers, who had at least a master's degree in psychology, conducted a total of five structured interviews at the clinic; in over 90% of the cases, the same interviewer conducted all five interviews.

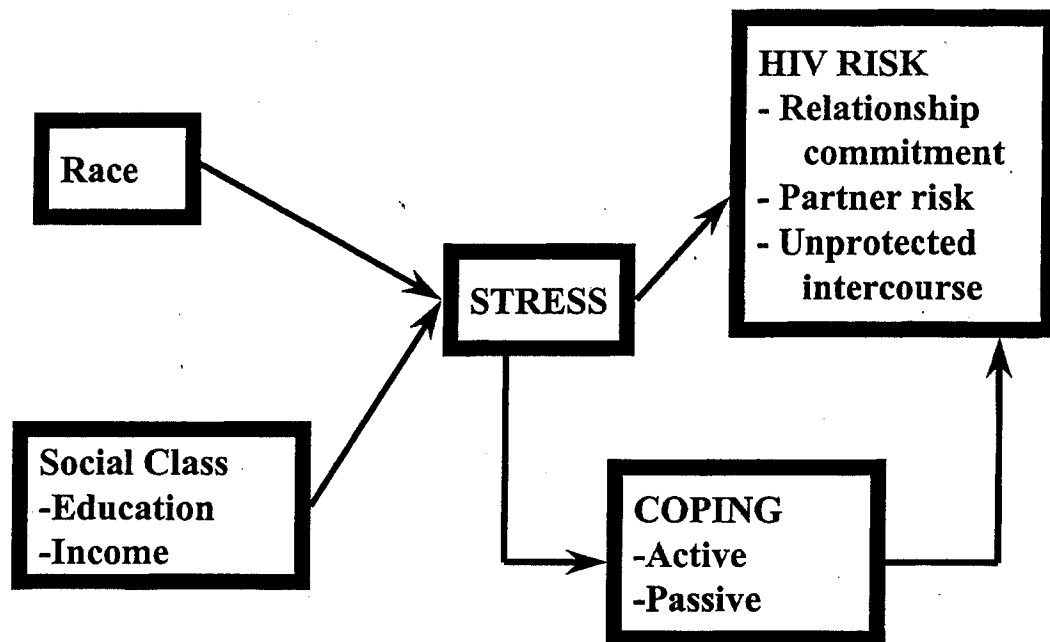


Fig. 1. Theoretical model of predictors of heterosexual HIV risk.

The fourth interviews were conducted in 1993, 12 months post-HIV C&T, and included all data relevant to the research currently discussed.<sup>8</sup> Over the study period, the retention rate was 80.2% (186/232). There were no significant differences between the original and the current samples in age, race, education, income, relationship commitment, or baseline HIV risk behaviors.

Three exclusion criteria were used for the purposes of these analyses: (1) Women of ethnic backgrounds other than White, African-American, and Latina were excluded due to the small number, and based on the literature no specific predictions could be made ( $n = 6$ ); (2) women who tested HIV-positive were excluded to avoid confounding the results based on reports of stress, coping, and sexual behavior ( $n = 7$ ); and (3) women who only had sex with other women were excluded because risk was defined as including unprotected vaginal or anal intercourse ( $n = 13$ ; of these, 2 were also excluded on the basis of their race/ethnic background). This resulted in a final sample size of 162 for the current analyses.

All procedures were approved by a university Human Investigations Committee as well as by Institutional Review Boards at each clinic. Participation

was completely voluntary and confidential. Respondents were told that their decision to participate in this research study would not affect their receipt of health care. Participants were paid a total of \$125 over the course of the study.

#### Instruments

Because the sample was diverse in race and socioeconomic background and some participants were illiterate, all measures were adapted for structured interviews conducted in English or Spanish.

#### Race

Race was self-reported at the first interview. African-American, Latina, and White women were included in these analyses. For purposes of model testing only, since we could not reliably order individuals by race, we examined women of color (i.e., African-American and Latina) versus Whites.

#### Social Class

Social class was measured using two primary components of social class, income and education,

<sup>8</sup>Data on stress and coping were not collected prior the fourth interview.

as independent indicators (Baquet *et al.*, 1991; Haan *et al.*, 1989; Winkelby *et al.*, 1990, 1992). We inquired about income from the following sources: job; government support; support provided by partner, family, others; and prostitution and drug-related income. Because of the wide and nonnormal distribution, annual income was divided into four categories on the basis of quartile distribution: (1) less than or equal to \$8,200; (2) \$8,201–\$13,200; (3) \$13,201–22,200; and (4) greater than or equal to \$22,201. Education was coded as (1) less than high school education, (2) completion of high school degree or the equivalent, (3) some college or vocational school, (4) completion of college degree or beyond.

### Stress

Overall life stress was measured with a revised version of the Community-Based Inventory of Current Concerns (CICC; Nyamathi and Flaskerud, 1992). This measure of stress was chosen because it includes domains relevant to individuals from broad ethnic and class backgrounds. The CICC examines perceived stress in the following domains: instability (e.g., no stable home), despondency (e.g., losing hope in the future), survival (e.g., concerns about personal safety), work (e.g., job loss), and parenting (e.g., concerns about children's well-being). For the purposes of this study, and in order to assess categories of life stress relevant to a wider range of social classes, domains relating to work and parenting were expanded, and new items were added to assess the domain of partner-related stress. On a 5-point Likert-type scale ranging from "not at all" to "always," participants were asked to rate how often each of the issues had been a source of worry over the past 12 months. The revised 27-item measure had good internal consistency (Cronbach alpha coefficient = .88).

### Coping

A shortened version of the Ways of Coping Scale (WOC; Folkman and Lazarus, 1986) was used to measure styles of coping. As with past AIDS research using the WOC (Folkman *et al.*, 1992), participants were asked to think about the most stressful problem they had experienced in the past month and to indicate on a 4-point Likert-type scale (ranging from "not at all" to "often") how often they used each of the strategies to deal with this stressor (e.g., "make a plan of action and follow it," "try to forget about the whole

thing"). Based on theoretical considerations and on a factor analysis of the 26 items, we divided coping style into two factors, representing passive coping and active coping. This two-factor model explained 82% of the variance. Cronbach alpha coefficients for passive and active coping were adequate (.73 and .75, respectively). This is consistent with a body of literature that has defined two similar styles of coping (Hobfoll *et al.*, 1994; Lazarus and Folkman, 1984; Lefcourt *et al.*, 1984; Sandler and Lakey, 1982; Suls and Fletcher, 1985).

### Sexual Behaviors and HIV Risk

Participants were asked about their sexual behavior in accordance with questionnaires developed for the Multicenter AIDS Cohort Studies, reflecting an understanding of high-risk sexual behavior. The instrument was modified by deleting questions about sexual activity in which only gay males might engage and adding activities specific to women (e.g., vaginal intercourse) (Ickovics *et al.*, 1994). Respondents reported the number of times they engaged in protected and unprotected vaginal and anal intercourse in the month prior to the interview.

Respondents also reported the number of sexual partners in the month prior to the interview. To examine partner risk, we devised a scale that asked participants to rate the likelihood that their partner(s) carried HIV, injected any drug with a needle, had sex with a man, and/or had sex with other partner(s) in the past year. Response categories ranged from 1 ("definitely not") to 5 ("definitely yes") on a 5-point Likert-type scale.

Based on this information, risk was defined by two independent variables. *Protected/unprotected intercourse* was based on self-reported sexual behaviors and determined by a hierarchically ordered three-level variable: (0) not sexually active, (1) no unprotected intercourse, (2) any unprotected intercourse. *Partner risk* was determined by the participant's perception of partners' risk. A four-level ordinal variable was devised: (1) no partner(s), (2) partner(s) with no known risk, (3) partner(s) with possible risk, or (4) partner(s) with definite risk.

In addition, we included a measure of *relationship commitment* because it is closely related to risk, having a direct impact on one's decision to engage in unprotected intercourse. Relationship commitment was determined by a hierarchical series of questions, and a four-level ordinal relationship variable was devised: (1) single (not involved in any relationship), (2) having a regular sexual partner, (3) committed or

married but not cohabiting, or (4) committed or married and cohabiting.

### Statistical Analyses

We used LISREL VIII to evaluate our conceptual model of HIV risk (Joreskog and Sorbom, 1993). Structural equation modeling (SEM) is particularly suited to testing theory when the structural relations among explanatory constructs can be specified and the number of constructs is limited. This was important for our model because we proposed that being a member of a minority group and lower social class would result in more stress, and stress, in turn, would result in higher levels of risk behaviors. SEM also permits statistical control for potentially confounding variables; in this model, we controlled for HIV testing status and age. In contrast to multiple regression techniques, SEM allows one to specify and simultaneously test direct and indirect effects of variables on one another (Kerwin *et al.*, 1987). Unlike path analysis or multivariate analysis of variance, SEM generates parameter estimates in such a way that the model specified is optimally fit. SEM also allows comparison of alternative models and model modification. Therefore, limitations of the original model can be examined and, based on this information, alternative models can be generated and explored (Kline and Klammer, 2001).

To evaluate the model's goodness of fit, we used the chi-square statistic and Akaike's measure of overall model fit (Bollen and Long, 1993). The chi-square statistic indicates whether the patterns of relations among the variables in the hypothesized model diverge significantly from the data from the observed sample. Statistical nonsignificance of the chi-square statistic indicates that a model provides an adequate representation of the data. Akaike's criterion (AIC) calibrates the match between the observed and expected covariance matrices.

## RESULTS

### Description of Study Sample

Table I provides demographic and background information on the study participants ( $N = 162$ ). Age ranged from 18 to 61 years with a mean of 30.8 ( $SD = 8.3$ ). Fifty-four percent of the women were White, 33% African American, and 13% Latina. Education ranged from no formal education to graduate degrees; 47% of the study participants completed

**Table I.** Sociodemographic Characteristics, Relationships and Sexual Risk Factors ( $N = 162$ )

	Percent	( <i>n</i> )
Sociodemographic characteristics		
Age (years)		
≤20	9.3	(15)
21–30	43.2	(70)
31–40	34.5	(56)
≥41	13.0	(21)
Race		
White	54.3	(88)
African-American	32.7	(53)
Latina	13.0	(21)
Education		
Less than high school	17.3	(28)
High school education or equivalent	29.6	(48)
Some college/vocational school	28.4	(46)
College degree and above	24.6	(40)
Annual income (quartiles)		
≤\$8,200	25.3	(41)
\$8,200–13,199	25.3	(41)
\$13,200–22,199	24.7	(40)
≥\$22,200	24.7	(40)
Relationship and sexual risk factors		
History of STD <sup>a</sup>		
Yes	59.3	(96)
No	40.1	(65)
Relationship commitment		
Single (not involved in any regular relationship)	24.7	(40)
Regular sex partner	13.6	(22)
Committed or married, but not cohabiting	45.7	(74)
Committed or married, and cohabiting	16.0	(26)
Partner HIV risk		
No partner	8.0	(13)
Partner(s) with no known risk	41.4	(67)
Partner(s) with possible risk	36.4	(59)
Partner(s) with definite risk	14.2	(23)
Protected/unprotected intercourse		
Not sexually active	8.0	(13)
No unprotected intercourse	37.7	(61)
Any unprotected intercourse	54.3	(88)

<sup>a</sup>Due to missing information, one participant is not included.

12 years of school or less. Annual income ranged from \$0 to \$65,000 (median = \$13,200); despite the wide distribution, the majority of women (75%) earned \$22,200 or less.

Nearly 60% of the women reported having been diagnosed with a sexually transmitted disease, indicating unprotected sex with a partner with a sexually transmitted disease, and increasing their vulnerability to HIV. One half of the women reported that their sexual partners had possible or definite risk of HIV (e.g., history or current injection drug use, sex with men) and 54% reported engaging

Table II. Correlations Among Study Variables<sup>a</sup>

	1	2	3	4	5	6
1. Race/ethnicity	1.00					
2. Education	.46***	1.00				
3. Income	.27*	.26***	1.00			
4. Active coping	-.06	.14*	.12	1.00		
5. Passive coping	-.03	-.10	-.16**	-.12	1.00	
6. Stress	-.03	-.06	-.16***	-.03	.45***	1.00
7. Partner risk	-.03	-.06	-.23***	-.07	-.23**	.30**
8. Relationship commitment	-.02	-.07	.29***	-.09	-.10	-.07
9. Unprotected intercourse	.14	-.05	.19**	-.07	-.02	-.01

<sup>a</sup>For analyses with two continuous variables, Person product-moment correlations are presented; for all other analyses, Kendall's tau (b) is presented.

\* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$ .

in unprotected intercourse within 1 month of the interview.

The mean stress score was 2.30 ( $SD = .60$ ), with a range of 1.12–4.09, indicating a moderate level of stress. The mean for passive coping was 2.46 ( $SD = .49$ ; range = 1.67–3.50) and the mean for active coping was 3.18 ( $SD = .46$ ; range = 1.80–4.00), indicating moderate endorsement of passive coping strategies and a greater use of active coping strategies.

### Examination of the Proposed Model

We began with a conceptual model based on the existing literature (Figure 1). In the initial model, we proposed that race and social class (i.e., income and education) would determine level of stress; minority status and low social class were expected to predict higher levels of stress. We predicted that higher stress would result in greater sexual risk, and this association was proposed to be mediated by coping style. A measurement model (as opposed to a latent structures model) based on the original theoretical model was devised for empirical examination via SEM. In the measurement model, the construct of social class was measured by two independent factors: income and education. The construct of coping was measured by two independent factors: passive and active coping. The construct of sexual risk behavior was reflected by three independent factors: relationship commitment, partner risk, and protected/unprotected intercourse. In addition, age and HIV testing history were statistically controlled in the model. The chi-square statistic associated with this model indicated poor model fit,  $\chi^2(df = 16) = 73.0$ ,  $p < .001$ ; AIC = 128.3.

Given this lack of model fit, bivariate relationships in the initial model were examined (Table II).

These revealed which associations in the model were accurate and inaccurate. First, although race/ethnicity had a significant association with education and income, it was unrelated to all other variables in the model. Income had the strongest associations with other variables in the model. Whites and those with higher education had higher income; as income increased, stress, passive coping, and partner risk decreased, whereas relationship commitment and unprotected intercourse increased. Education, stress and coping demonstrated only limited associations with other variables in the model. Accordingly, we revised the model to better fit the indicated relationships observed in the data.

### The Revised Model

The new measurement model allowed examination for direct and indirect relationships among race/ethnicity, social class, coping, stress, and HIV risk. As before, age and HIV testing history were controlled in the model. A set of nested models was fitted, dropping nonsignificant coefficients. Given the divergent bivariate associations (e.g., income and education had inconsistent associations with outcome variables; unprotected intercourse, partner risk, and relationship commitment were each related to different predictors), each indicator was treated as an independent measure not part of a broader underlying latent construct. The structure and results of this revised model are presented in Figure 2. The chi-square statistic of the revised model indicated that it exhibited adequate goodness of fit,  $\chi^2(df = 44) = 32.7$ ,  $p = .90$ ; AIC = 76.7.<sup>9</sup>

<sup>9</sup>To ensure the robustness of the model, the model was rerun on the subsample from which the women who reported no sexual

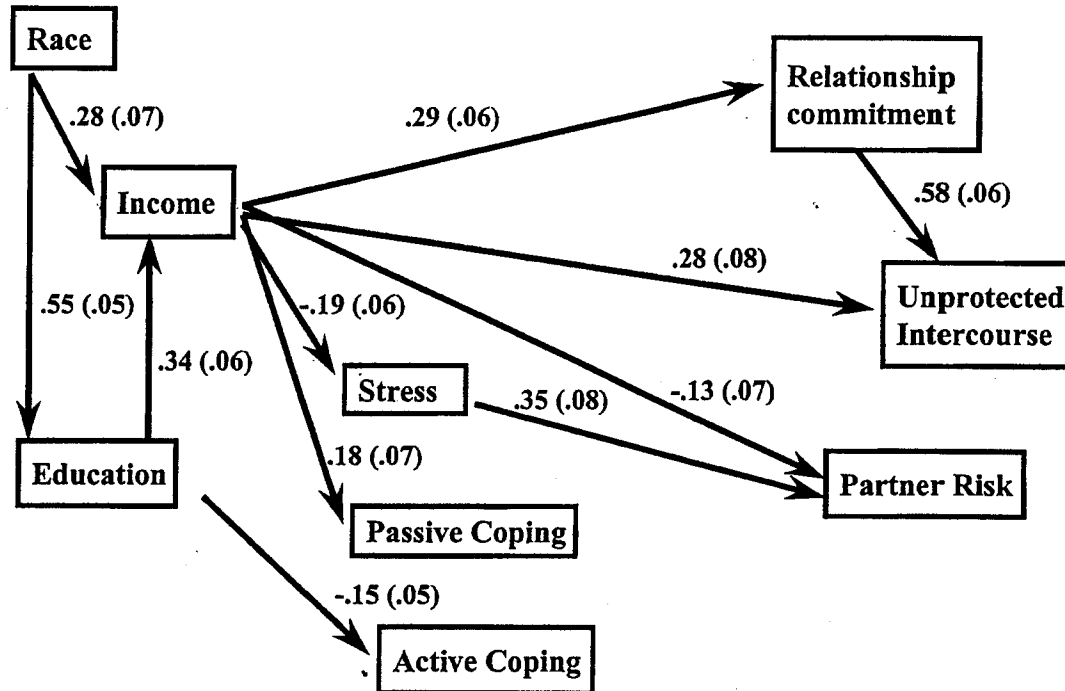


Fig. 2. Predictors of heterosexual HIV risk. LISREL-generated beta, gamma, and phi values (standard error), controlling for age and HIV testing; only significant values are reported.

Although race/ethnicity was associated with education and income, race/ethnicity was not significantly related to stress, active or passive coping, or any risk variables. Education was only related to active coping, and active coping was not related to any additional variables in the model. Women with lower income had higher stress, and those with higher stress had greater partner risk. Women with higher income were also more likely to engage in passive coping strategies; however, neither passive nor active coping style was related to heterosexual HIV risk variables. Income had a direct association with all of the heterosexual risk variables. As income increased, partner risk factors declined, relationship commitment increased, and unprotected intercourse increased. Women with higher incomes were more likely to be in committed relationships with lower risk partners and they were more likely to engage in unprotected intercourse. The

activity were excluded. The results were essentially the same, indicating adequate goodness of fit,  $\chi^2(df=44) = 42.6, p = .53$ ; AIC = 86.6. Although there were some changes in absolute values of the parameter estimates (e.g., the parameter linking income and partner risk changed from  $-.13$  to  $-.29$ —this was the largest change in the model), the overwhelming majority of the parameters remained very close to their initial value and no parameters changed their sign.

strongest association in the model was between relationship commitment and unprotected intercourse (beta = .58). Women in more-committed relationships were significantly more likely to engage in unprotected intercourse. Partner risk was unrelated to both relationship commitment and engagement in unprotected intercourse.

The final model accounted for 1/2 the variance in relationship commitment ( $R^2 = .51$ ), 1/4 of the variance in partner risk ( $R^2 = .27$ ), and 1/10 of the variance in unprotected intercourse ( $R^2 = .10$ ). When eliminating all nonsignificant paths in a final revised model, none of the parameter estimates nor the overall significance of the model significantly changed; therefore, the results are not reported here.

#### Post hoc Analyses on Race/Ethnicity and Heterosexual HIV Risk Behavior

Post hoc analyses were conducted to examine the association between race/ethnicity and heterosexual HIV risk behavior. There were no significant differences in risk behaviors in this study sample. Across race/ethnicity (African American, Latina, White), 25% were single, 14% had a regular sex partner,



46% were in a committed relationship, and 16% were in a committed relationship and cohabitating. Fifty-one percent of the women in this sample had a sexual partner with possible or definite HIV risk (57% of African-Americans and 48% of both Whites and Latinas;  $\chi^2 = 2.5, p = .87$ ). Fifty-four percent of the women in this sample engaged in unprotected intercourse (45% of African-Americans, 57% of Whites, and 67% of Latinas;  $\chi^2 = 3.3, p = .20$ ).

## DISCUSSION

We began with a model to examine some of the pathways by which women of color and those of lower social class may be at higher risk for HIV. Race/ethnicity played a limited role in the final model of HIV risk, and post hoc analyses revealed no significant differences in heterosexual HIV risk behaviors by race or ethnicity. We found that social class—specifically income—was a more important factor in predicting sexual risk behaviors. However, given that minority women were more likely to be of lower social class, the association between social class and risk is important in its application to HIV prevention interventions for women of color.

Recent studies have indicated that social class may be a more important health indicator than race; adjustment for social class may eliminate or reduce signs of racial disparity in health. Social class differences have persisted, even after controlling for race, in reports of general poor health (Navarro, 1990), violent deaths (Greenberg and Schneider, 1994), illegal drug use (Lillie-Blanton *et al.*, 1993), and recovery from myocardial infarction (Ickovics *et al.*, 1997). Williams and Collins (1995) suggest that failing to adjust for social class in studies of health can reinforce racial prejudices and stereotypes, diverting both public attention and research funding from the underlying social factors responsible for the differential patterns of health risk.

One way to begin to understand the complex associations among social class, race/ethnicity, and women's high-risk sexual behavior is to consider "pathways" and definitions of risk. Women with higher income were more likely to engage in unprotected intercourse, conferring greater HIV risk. This can be explained in part by the association between income and relationship commitment; higher income was associated with being in a committed relationship, which in turn was associated with greater unprotected intercourse. However, lower income was as-

sociated with higher stress, and stress was associated with greater partner risk. Because these data are cross sectional, we are unable to determine whether those with higher levels of life stress are more likely to have risky partners or whether those with risky partners are more likely to report higher levels of stress.

These findings highlight the complex nature of defining risk and have implications for HIV prevention. Both individual risk behaviors and the risk posed by sexual partners' behaviors must be considered. For instance, women with higher income may need to be counseled about the risks of unprotected intercourse, even in the context of a "committed" relationship. On the other hand, women with lower income must continue to be the focus of HIV prevention particularly with regard to the selection of sexual partners at high risk for HIV. One must consider opportunities (or lack thereof) for choice in partner selection, particularly because lower income areas have a higher prevalence of potential sex partners at high-risk of infection with HIV and other sexually transmitted diseases, placing women at greater overall risk.

Recent studies have indicated that financial status is an important indicator of HIV-related risk behavior. Soler and colleagues (2000) found that women who did not make independent monetary decisions were 80–90% less likely to be consistent condom users. Zierler and colleagues (2000) called economic inequality "an underlying cause of AIDS." They found that the incidence of AIDS in communities with high levels of economic deprivation (>40% of population living below the poverty line) was seven times higher than in communities with low levels of economic deprivation (<2% of the population living below the poverty line). However, it is important to note that community-level interventions specifically targeting low-income women have been successful in reducing HIV risk behaviors (Lauby *et al.*, 2000; Sikkema *et al.*, 2000).

This study had several notable strengths. First, the study was theoretically driven, testing a specific model of HIV risk for women. Second, it included a diverse, clinic-based sample of women representative of their communities; this enabled us to test for differences across social class and race/ethnicity, rather than limit the analyses to a particular group of women more homogeneous in class or ethnic distribution. Finally, we used structural equations modeling, which enabled the testing of specific hypothesized associations among variables of interest.

On the other hand, there were several limitations that should be considered. First, our findings based

on race and social class must be drawn with caution, considering the large sample sizes that generally are necessary to examine the effects of sociodemographic variables. However, even with the moderate size of this study sample, there was empirical support for the effects of income on HIV risk. Measurement issues are always a concern as well; for instance, we did not have adequate data on occupation, which could have been used to expand our definition of social class. In addition, drug use was not included in this model of HIV risk because very few women reported illicit drug use; therefore, this study was restricted to an examination of HIV heterosexual risk. To further understand the complicated relationships among race, social class, coping, stress, and HIV risk, longitudinal studies are required. This study will need to be replicated with larger study samples and in additional geographic regions to determine its generalizability. Finally, because the final model was not the model initially defined, cross-validation is required.

In conclusion, the prevention literature increasingly points to the importance of *cultural sensitivity* in HIV risk prevention efforts with individuals from diverse backgrounds. This study highlights the importance of empirically testing theoretical assumptions about racial/ethnic minority and low-social-class groups and the behaviors and experiences that may place them at increased risk for HIV. Not only is it important to understand that social class may be a more important factor than race/ethnicity in predicting HIV risk, but it is also important to consider various pathways of risk that women from different backgrounds may follow.

#### ACKNOWLEDGMENTS

This study was funded by American Foundation for AIDS Research Grants 001421-10-RGD and 001562-12-RGR. Additional intellectual and financial support was obtained from the John D. and Catherine T. MacArthur Foundation's planning initiative on socioeconomic status and health. The authors would like to thank the clinic staff at each of the study sites for their critical support and encouragement and their integral role in recruitment: Fair Haven Community Health Clinic, Hill Health Center, New Haven Family Planning Clinic, and Women's Health Services, Inc.

#### REFERENCES

- Aldwin, V. M. (1994). *Stress, coping, and development: An integrative perspective*. New York: Guilford Press.
- Alexander, B. K., and Hadaway, P. F. (1982). Opiate addiction: The case for an adaptive orientation. *Psychological Bulletin*, *92*, 367-381.
- Amaro, H. (1995). Love, sex and power: Considering women's realities in HIV prevention. *American Psychologist*, *50*, 437-447.
- Aral, S. E., and Wasserheit, J. N. (1995). Interactions among HIV, other sexually transmitted diseases, socioeconomic status, and poverty in women. In A. O'Leary and L. S. Jemmott (Eds.), *Women at risk: Issues in the primary prevention of AIDS* (pp. 13-41). New York: Plenum Press.
- Baquet, C., Horm, J., Gibbs, T., and Greenwald, P. (1991). Socioeconomic factors and cancer incidence among Blacks and Whites. *Journal of the National Cancer Institute*, *83*, 551-557.
- Becker, E., Rankin, E., and Rickel, A. U. (Eds.). (1998). *High-risk sexual behavior: Interventions with vulnerable populations*. New York: Plenum Press.
- Bollen, K. A., and Long, J. S. (Eds.). (1993). *Testing structural equation models*. Newbury Park: Sage.
- Centers for Disease Control and Prevention (2001). *HIV/AIDS Surveillance Report*, *12*, Atlanta, GA: Author.
- Cornelius, L. J., Okundaye, J. N., and Manning, M. C. (2000). Human immunodeficiency virus-related behavior among African-American females. *Journal of the National Medical Association*, *92*, 183-195.
- de Bruyn, M. (1992). Women and AIDS in developing countries. *Social Science and Medicine*, *34*, 249-262.
- De La Canela, V. (1989). Minority AIDS prevention: Moving beyond cultural perspectives towards sociopolitical empowerment. *AIDS Education and Prevention*, *1*, 141-153.
- Dohrenwend, B. P. (Ed.). (1998). *Adversity, stress and psychopathology*. New York: Oxford University Press.
- Faryna, E. L., and Morales, E. (2000). Self-efficacy and HIV-related risk behaviors among multiethnic adolescents. *Cultural Diversity and Ethnic Minority Psychology*, *6*, 42-56.
- Fee, E., and Krieger, N. (1993). Understanding AIDS: Historical interpretations and the limits of biomedical individualism. *American Journal of Public Health*, *83*, 1477-1486.
- Fernandez, I. (1995). Latinas AIDS: Challenges to prevention efforts. In A. O'Leary and L. Jemmott (Eds.), *Women and AIDS: Primary prevention* (pp. 159-174). New York: Plenum Press.
- Finn, P. R., Martin, J., and Pihl, R. O. (1987). Alexithymia in males at high genetic risk for alcoholism. *Psychotherapy and Psychosomatics*, *47*, 18-21.
- Folkman, S., Chesney, M. A., Pollack, L., and Phillips, C. (1992). Stress, coping, and high-risk sexual behavior. *Health Psychology*, *11*, 218-222.
- Folkman, S., and Lazarus, R. S. (1986). The dynamics of a stressful encounter: Cognitive appraisal, coping, and encounter outcomes. *Journal of Personality and Social Psychology*, *50*, 992-1003.
- Greenberg, M., and Schneider, D. (1994). Violence in American cities: Young Blacks is the answer, but what was the question? *Social Science and Medicine*, *39*, 179-187.
- Gupta, G., and Weiss, E. (1993). Women's lives and sex: Implications for AIDS prevention. *Culture, Medicine and Psychiatry*, *17*, 399-412.
- Haan, M., Kaplan, G., and Camacho, S. L. (1989). Socioeconomic status and health: Old observations and new thoughts. In J. Bunker, D. Gomby, and B. Kehrler (Eds.), *Pathways to health: The role of social factors* (pp. 76-135). Menlo Park, CA: Henry J. Kaiser Family Foundation.
- Hobfoll, S. E., Dunahoo, C. L., Ben-Parath, Y., and Monnier, J. (1994). Gender and coping: The dual axis model of coping. *American Journal of Community Psychology*, *22*, 49-81.
- Ickovics J. R., Druley, J., Grigorenko, E., Morrill, A., Beren, S., and Rodin, J. (1998). Long-term effects of HIV counseling and testing for women. *Health Psychology*, *17*, 395-402.
- Ickovics, J. R., Morrill, A. C., Beren, S. E., Walsh, U., and Rodin, J. (1994). Limited effects of HIV counseling and testing for

- women. *Journal of the American Medical Association*, 272, 443-448.
- Ickovics, J. R., and Rodin, J. (1992). Women and AIDS in the United States: Epidemiology, natural history, and mediating mechanisms. *Health Psychology*, 11, 1-16.
- Ickovics, J. R., Thayaparan, B., and Ethier, K. (2000). Women and AIDS: A contextual analysis. In A. Baum, T. Revenson, and J. Singer (Eds.), *Handbook of Health Psychology* (pp. 821-839). Hillsdale, NJ: Erlbaum.
- Ickovics, J. R., Viscoli, C. M., and Horwitz, R. I. (1997). Recovery following myocardial infarction: The importance of social class. *Annals of Internal Medicine*, 217, 518-525.
- Jemmott, L. S., Catan, V., Nyamathi, A., and Anastasia, J. (1995). African American women and HIV-risk reduction issues. In A. O'Leary and L. S. Jemmott (Eds.), *Women at risk: Issues in the primary prevention of AIDS* (pp. 131-157). New York: Plenum Press.
- Joreskog, K. G., and Sorbom, D. (1993). *LISREL VIII: User's reference guide*. Mooresville, IN: Scientific Software.
- Jung, J., and Khalsa, H. K. (1989). The relationship of daily hassles, social support, and coping to depression in Black and White students. *Journal of General Psychology*, 116, 407-417.
- Kerwin, M. S., Howard, G. S., Maxwell, S. E., and Borkowski, J. G. (1987). Implications of covariance structure analysis (LISREL) versus regression models for counseling research. *Counseling Psychologist*, 15, 287-310.
- Kessler, R. C., and Neighbors, H. W. (1986). A new perspective on the relationships among race, social class, and psychological distress. *Journal of Health and Social Behavior*, 27, 107-115.
- Klevens, R. M., Diaz, T., Fleming, P. L., Mays, M. A., and Frey, R. (1999). Trends in AIDS among Hispanics in the United States, 1991-1996. *American Journal of Public Health*, 89, 1104-1106.
- Kline, T. J. B., and Klammer, J. D. (2001). Path model analyzed with ordinary least squares multiple regression versus LISREL. *Journal of Psychology*, 135, 213-225.
- Lauby, J. L., Smith, P. J., Stark, M., Person, B., and Adams, J. (2000). A community-level HIV prevention intervention for inner-city women: Results of the women and infants demonstration projects. *American Journal of Public Health*, 90, 216-222.
- Lazarus, R., and Folkman, S. (1984). *Stress, appraisal, and coping*. New York: Springer.
- Lefcourt, H. M., Martin, R. A., and Selah, W. E. (1984). Locus of control and social support: Interactive moderators of stress. *Journal of Personality and Social Psychology*, 47, 378-389.
- Lillie-Blanton, M., Anthony, J. C., and Schuster, C. R. (1993). Probing the meaning of racial or ethnic group comparisons in crack cocaine smoking. *Journal of the American Medical Association*, 269, 993-997.
- Mays, V. M., and Cochran, S. D. (1988). Issues in the perception of AIDS risk and risk reduction activities by Black and Hispanic/Latina women. *American Psychologist*, 43, 949-957.
- McEwen, B. S. (1998). Protective and damaging effects of stress mediators. *New England Journal of Medicine*, 338, 171-179.
- McKusick, L. M., Hortsman, W., and Coates, T. J. (1985). AIDS and sexual behavior reported by gay men in San Francisco. *Journal of Public Health*, 75, 493-496.
- Morrill, A. C., Ickovics, J. R., Golubchikov, V., Beren, S., and Rodin, J. (1996). Safer sex: Social and psychological predictors of behavioral maintenance and change among heterosexual women. *Journal of Clinical and Consulting Psychology*, 64, 819-828.
- Navarro, V. (1990). Race or class versus race and class: Mortality differentials in the United States. *Lancet*, 336, 1238-1240.
- Nyamathi, A. M. (1992). Comparative study of factors relating to HIV risk level of Black homeless women. *Journal of Acquired Immune Deficiency Syndromes*, 5, 222-228.
- Nyamathi, A. M., and Flaskerud, J. (1992). A community-based inventory of current concerns of impoverished homeless and drug-addicted minority women. *Research in Nursing and Health*, 15, 121-129.
- Pearlin, L. I., and Aneshensel, C. S. (1986). Coping and social supports: Their functions and applications. In L. Aiken and D. Mechanic (Eds.), *Applications of social science to clinical medicine and health policy* (pp. 417-437). New Brunswick, NJ: Rutgers University Press.
- Pohorecky, L. A. (1981). The interaction of alcohol and stress: A review. *Neuroscience and Biobehavioral Review*, 5, 209-229.
- Rodin, J., and Ickovics, J. R. (1990). Women's health: Review and research agenda as we approach the 21st century. *American Psychologist*, 45, 1018-1034.
- Rosario, M., Rotheram-Borus, M. J., and Reid, H. (1996). Gay-related stress and its correlates among gay and bisexual male adolescents of predominantly Black and Hispanic background. *Journal of Community Psychology*, 24, 136-159.
- Rotheram-Borus, M. J., Coopman, C., and Ehrhardt, A. A. (1991). Homeless youths and HIV infection. *American Psychologist*, 46, 1188-1197.
- Russell, L. D., Alexander, M. K., and Corbo, K. F. (2000). Developing culture-specific interventions for Latinas to reduce HIV high-risk behaviors. *Journal of the Association of Nurses in AIDS Care*, 11, 70-76.
- Ryan, D. (1997). *New Haven on-line* [Database]. New Haven, CT: Yale University, Institution for Social and Policy Studies [producer and distributor].
- Saldana, D. H. (1994). Acculturative stress: Minority status and distress. *Hispanic Journal of Behavioral Sciences*, 16, 116-128.
- Sandler, I. N., and Lakey, B. (1982). Locus of control as a stress moderator: The role of perceptions and social support. *American Journal of Community Psychology*, 10, 65-80.
- Schilling, R. F., El-Bassel, N., Schinke, S. P., and Nichols, S. (1991). Sexual behavior, attitudes toward safer sex, and gender among a cohort of 244 recovering drug users. *International Journal of the Addictions*, 26, 859-877.
- Shain, R. N., Piper, J. M., Newton, E. R., Perdue, S. T., Ramos, R., Champion, J. D., and Guerra, F. A. (1999). A randomized, controlled trial of a behavioral intervention to prevent sexually transmitted disease among minority women. *New England Journal of Medicine*, 340, 93-100.
- Sher, K. J. (1987). Stress response dampening. In H. T. Blane and K. E. Leonard (Eds.), *Psychological theories of drinking and alcoholism*. New York: Guilford Press.
- Sikkema, K. J., Kelly, J. A., Winett, R. A., Solomon, L. J., Cargill, V. A., Roffman, R. A., McAuliffe, T. L., Heckman, T. G., Anderson, E. A., Wagstaff, D. A., Norman, A. D., Perry, M. J., Crumble, D. A., and Mercer, M. B. (2000). Outcomes of a randomized community-level HIV prevention intervention for women living in 18 low-income housing developments. *American Journal of Public Health*, 90, 57-63.
- Soler, H., Quadagno, D., Sly, D. F., Riehm, K. S., Eberstein, I. W., and Harrison, D. F. (2000). Relationship dynamics, ethnicity and condom use among low-income women. *Family Planning Perspectives*, 32, 82-88.
- Stein, J. A., and Nyamathi, A. (1999). Gender differences in relationships among stress, coping and health risk behaviors in impoverished, minority populations. *Personality and Individual Differences*, 26, 141-157.
- Stiffman, A. R., Dore, P., Cunningham, R. M., and Earls, F. (1995). Person and environment in HIV risk behavior change between adolescence and young adulthood. *Health Education Quarterly*, 22, 211-226.
- Stone, A. A., Lennox, S., and Neale, J. M. (1985). Daily coping and alcohol use in a sample of community adults. In S. Shiffman and T. A. Wills (Eds.), *Coping and substance use* (pp. 199-220). New York: Academic Press.
- Suls, J., and Fletcher, B. (1985). The relative efficacy of avoidant and nonavoidant coping strategies: A meta-analysis. *Health Psychology*, 4, 249-288.

