

## FACTORS INFLUENCING CHANGE BEHAVIOR: RISK REDUCTION FOR HIV INFECTION

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Theoretically informed models are estimated that specify main and interaction effects of a general change to safer/healthier behavior. The subjects of this study are participants in an ongoing longitudinal panel study of adaptations to stress. The sample consists of a portion of those identified in their mid-twenties (Time 4) as at high risk for HIV infection and successfully reinterviewed. A matched group of those at Time 4 who were at low risk for HIV infection were also reinterviewed as part of this analysis. One Ordinary Least Square regression model was estimated in which five independent variables, six control variables, and ten interaction terms are regressed on the dependent variable. In general, the results support many of the factors of the Health Belief Model (HBM), but provide other factors, including interaction effects, which are also relevant to a general change in behavior.

We estimated a model that specifies independent and moderating effects that predict a general change to safer behavior for reducing one's risk of HIV/AIDS infection. The analysis extends the research on change behavior and the Health Belief Model (HBM) to recognize additional social factors that predict safer behavior change as it relates to HIV/AIDS transmission. Specifically, the present analysis includes such additional factors as structural support in terms of one's

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This work was supported by research grants (R01 DA 02497 and R01 DA 10016) and a Research Scientist Award (K05 DA 00136) from the National Institute on Drug Abuse to the second author.

Appreciation is due to reviewers including: Susan Pick, PhD, Maricarmen Alvarez, IMIFAP-Education, salud y vida, Malaga Norte No. 25, Col. Insurgentes Mixcoac, Mexico, D.F. 03920. Email: <maca@imifap.org.mz>; Stephen Sutton, PhD, Professor of Behavioral Science, University of Cambridge, Institute of Public Health, Forvie Site, Robinson Way, Cambridge CB2 2SR, UK. Email: <Srs@medschl.cam.ac.uk>

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social network, and relationship status as factors that may predict a general change to safer behavior.

The Human Immunodeficiency Virus (HIV) disease (referring to all stages of illness caused by the virus, including the AIDS stage) is a global disease. According to the World Health Organization statistics, there were 1,987,217 AIDS cases reported worldwide as of November 1999 (Lert, 2000a). Despite the fact that death rates from AIDS have fallen to their lowest rates since 1987, AIDS remains the fifth leading cause of death among Americans between 25 and 44 years of age (Nations Health, 1999).

HIV disease occurs when the body fluids, primarily blood or semen, of an infected person gain entry into the bloodstream of one who is not infected with the virus. HIV is transmitted through sexual contact, by inoculation of blood through sharing of contaminated needles or accidental piercings, and maternofetally or through breastfeeding (Henkel, 1999; Pinching 1988). While the transmission of blood or semen from one individual to another can occur through somewhat limited means, the social patterns and behaviors associated with the transmission of the HIV are complex and interrelated (Power, 1990). The social behavioral patterns that facilitate the transmission of HIV disease are typically associated with deviant groups in society such as intravenous drug users (IDUs), those in the sex industry (prostitutes) and homosexual or bisexual males. However, we must recognize that it is the high-risk social and behavioral processes occurring within some groups more than other groups that transmit, or facilitate the transmission of, HIV disease. Homosexual males, prostitutes, and IDU's have a higher risk of HIV infection because their behaviors, and the prevalence of infection in those with whom they share these behaviors, increase the likelihood of their being exposed to an infected person (Bruhn, 1990). According to the Centers for Disease Control and Prevention (1999), as of December 1999, thirty-six percent of the nation's AIDS cases were associated with IDUs.

HIV disease is a social phenomenon because the epidemic is the outcome of patterns of human social behavior and is a stimulus for patterned human social behavioral responses. HIV disease is transmitted through risk-taking behavior. The literature is replete with research focusing on the factors related to risk-taking behaviors (Aspinwall, Kemeny, Taylor, Schneider, & Dudley, 1991; Bandura, 1990; Catania, Kegeles, & Coates, 1990; Fisher & Misovich, 1990; Kelly et al., 1990; McCusker, Stoddard, Zapka, Zorn, & Mayer, 1989; Ostrow et al., 1990; Sacco, Levine, Reed, & Thompson, 1991).

Risk-reducing behavior as a patterned human social behavioral response is an attempt to adapt to, cope with, and defend against HIV disease. The importance of understanding factors related to risk reduction lies in the recognition that only

when we understand the predictors that result in safer behavior change will we be able to successfully implement educational initiatives and procedures to reduce the risk of infection to individuals not yet infected with HIV as well as to reduce the risk of those infected infecting others.

Several factors might affect one's preventive behavior or risk-taking behavior. The HBM is most commonly used to explain the adoption of preventive behavior for guarding against disease (Becker 1974). Within the HBM, the factors that are related to the adoption of preventive behavior are perceptions of susceptibility/vulnerability, severity, benefit of a change in behavior, the barriers involved in changing behavior, and a symptom or other stimulus affecting change (Janz & Becker, 1984). The HBM model is based on the premise that one's beliefs regarding one's healthcare form the basis for the decision to comply, or not to comply with prescribed healthcare regimens or disease-preventive behavior. Thus, the HBM is based on a cognitive model of behavior change.

Research correlating risk and behavior has produced contradictory findings. Some findings suggest a positive correlation between perceived risk and safe-behavior change (Allard, 1989; McCusker et al., 1989; Visser & Smith, 1999). Other findings suggest that perceived risk and behavior changes are not positively correlated (Emmons et al., 1986; Joseph et al., 1987; Estep, Waldorf, & Marotta, 1992; Simon, Morse, & Balson, 1993). While perceptions of risk for acquiring HIV/AIDS are low, HIV/AIDS is overwhelmingly perceived as serious (Glik, Kronenfeld, Jackson, & Zhang, 1999).

Another of the reported aspects of the HBM is "perceived severity." Thus, it is plausible that the perceived severity of having AIDS, in terms of believing that individuals with AIDS will eventually die, would affect one's preventive behavior (risk-reducing behavior). However, recent reports suggest that risky sexual behavior is once again on the rise among gay males. New drugs to treat AIDS are enabling infected individuals to live longer and relatively normal lives. This has brought about changes in attitude, resulting in disregard for safe-sex messages (Harpaz, 1999). Current research indicates that advances in HIV therapy have improved the living conditions of those individuals who are HIV positive, as well as reduced its infectiousness. Thus, it should be no surprise that perceptions of severity are now lower than ever before because HIV is becoming a chronic disease due, in part, to medical advances as well as to increased optimism (Lert, 2000b).

Another factor within the HBM that is responsible for the adoption of preventive health behavior is "a cue" to change, such as a symptom or even a media communication. Therefore, it is most likely that symptoms of AIDS, or objective indicators of prior poor health should trigger preventive health behavior. Interestingly, the media have tended to target males in high-risk categories more than women as the group which should be most concerned with

contracting the HIV virus and thus which is most in need of adopting safe behaviors. Currently, media informational campaigns and activist movements have decreased. The media promote a message that suggests that HIV issues are ordinary medical issues not having a direct effect on the majority of the population (Lert, 2000b).

There are other factors, besides those within the HBM, that are associated with health-related behaviors. One such factor is the presence of structural support. This refers to the number or frequency of one's contacts with social-network members. The frequency or number of individuals within one's social network may be an indicator of the individual's level of social integration (Barrera, 1986; House & Kahn, 1985). Those in one's social network may provide coping assistance, encourage healthier behaviors, encourage medical attention, encourage adherence to doctor's orders and the taking of medications, or provide any number of other health-related types of assistance (Berkman, 1984; Fennell, Foulkes, & Boggs, 1994; Hart, Einav, Weingarten, & Stein, 1990; Rodin & Salovey, 1989).

A related factor is one's relationship status. Certainly, being married or in a long-term relationship is an indicator of support, yet, the complexity of HIV/AIDS seems to suggest that being in a stable relationship may have a negative effect on health behavior. A feeling of exclusiveness with one's partner may produce, trust, intimacy, and a subsequent sense of invulnerability and therefore decreased condom use (Hammer, Fisher, & Fisher 1996). Several studies have noted that it is the condition of being within a primary relationship, rather than in one less serious, that may result in significantly more unsafe activities between gay males (Buzwell & Rosenthal, 1996; Kordoutis, Loumakou, & Sarafidou, 2000; Levine & Siegel, 1992; Stall, 1988). This is particularly noteworthy because now "the primary mode of transmission of HIV among homosexual men (unprotected anal intercourse) has been established" (Turner, Miller, & Moses, 1989, p. 128). However, anal intercourse is not restricted to homosexual relationships. According to the latest most comprehensive sexual behavior survey of the population in general, anal sex between males and females does occur, but most often in longer-term relationships, live-in relationships, and in marriages (Laumann, Gagnon, Michael, & Michaels, 1994). Research suggests the greater likelihood of condom use by those who are less familiar with their partner or who are less likely to have an exclusive partner (Dubois-Arber & Spencer, 1998; Kane, 1991; Laumann et al., 1994). Laumann et al. conclude that a direct link exists between perceived risk and condom use. However, this may depend on the type or stage of a relationship:

Perhaps insisting on a condom in the initial stages of a relationship is particularly awkward, although it would not seem to be so with a one-night

partner or with a paid/paying partner. This may be an important window for the transmission of infection (Laumann et al. 1994, p. 421).

The awkwardness of asking for condom use when one is in the early stages of a relationship may allow for the transmission of HIV disease. However, the lack of condom use within a stable long-term relationship with someone exhibiting other risky behaviors, such as IV drug use, increases one's chances of acquiring HIV disease (Kane, 1991). According to Kane, being in a long-term, stable relationship as a predictor of risky behavior goes against the beliefs or perceptions of those groups most recognized as being at high risk.

An analysis of prior research reveals several limitations that the present research seeks to overcome. First, many researchers investigating the relationship between the HBM and safer/healthful behavior change with regard to HIV disease have restricted their analysis to gay males, those at risk who are not yet infected, and to IDUs. The present analysis encompassed both high- and low-risk males and females. Second, the present analysis examined interaction effects as it is likely that, in an issue as complex as HIV-related social phenomena, main effects alone provide an incomplete picture of the predictors of safer behavior change. That is, many important predictors of a general change to safer behavior may be more than linear and additive effects. Third, in addition to examining several factors of the HBM, this analysis included additional predictors that are most likely to be related to safer/healthful behavior change such as discussing HIV/AIDS with others as evidence of participation in social networks, as well as one's relationship status. Finally, the present analysis sought to examine predictors of a general change in behavior rather than examining specific change behaviors. The examination of predictors of the change in specific high-risk behaviors provides an interesting agenda for future research.

## DATA AND METHOD

### SAMPLE

The subjects of this study are participants in an ongoing longitudinal panel study of adaptations to stress which began in 1971 at which time a random half (18 of 36 schools) of the schools containing seventh grades in the Houston Independent School District were surveyed ( $N = 9,300$ ). Over 7,700 of the cohort of 9,300 (7th graders in the 18 schools) supplied usable data at Time 1 and were remeasured in 1972 and 1973. From 1980 to 1987, the fourth wave (Time 4) of this panel study was conducted, at which time over 6,074 individuals from the original cohort of 9,300 were reinterviewed as young adults.

To determine if sample attrition introduced biases in the time 4 data set, we have previously (Stiles, Liu, & Kaplan, 2000) compared the means and standard deviations on selected Time 1 variables of all participants who were present at

Time 1 in the seventh grade and the means and standard deviations of the same Time 1 variables for those participants who provided data at Time 4 (the attrited sample). The differences were quite small. Although sample attrition between Time 1 and Time 4 may be presumed to have little impact on the present sample, in actuality we do not really know the effect of attrition on the sample. We do know that the sample for the present analyses was remarkably similar to the full Time 1 sample (82 percent of the cohort).

Between 1987 and 1988, the fifth wave (Time 5) of the study was conducted. The sample consisted of those identified at Time 4 as at high risk for HIV infection and successfully reinterviewed ( $N = 507$ ). See the variables section for a list of items used to screen high-risk behavior. A matched group ( $N = 972$ ) of those at Time 4 who were at low risk for HIV infection was also reinterviewed as part of the Time 5 sample. This produced a sample of 1,479 at Time 5. Blood samples were collected from subjects and sent to an independent laboratory to test for the presence of the HIV virus. The 12 individuals in the sample who tested positively for HIV/AIDS were eliminated from analyses to avoid confounding results.

## VARIABLES

The models to be tested specify predictors of “general change,” to what the respondent believes to be safer/healthful behavior, while controlling for a number of variables that might be related to both the independent variables of interest and the dependent variable, “general change” behavior. Ten interaction terms involving the independent variables and the “risk category” (high versus low risk) were also included in the analysis. The scales comprising the following variables are presented in Appendix A.

**Dependent Variable.** General change is measured as the sum of change behaviors that were in a healthful direction that the respondent reported changing. Change behavior was reported as safer/healthful behavior change if risky behaviors were affirmed as being done “less often” or “neither more nor less often, but have been doing it with more caution.” Change behavior was reported as not a safe/healthful behavior change if risky behaviors (example: sex without condoms) were affirmed as being done “more often” or if subjects reported there had “been no change.”

**Independent Variables.** There are five independent variables of interest. The first independent variable of interest is “Vulnerability.” Vulnerability is a seven-item index coded so that high scores indicate a greater sense of vulnerability to illness (Cronbach’s alpha .54). The second independent variable of interest is “discuss AIDS.” The number of individuals with whom one has discussed AIDS is an indication of one’s participation in social networks. Discuss AIDS is a nine-item scale coded so that higher scores indicate the increased number of

individuals with whom one has had a discussion about AIDS (Cronbach's alpha .76). The third independent variable of interest is perception of "risk" of HIV/AIDS associated with each of the 36 behaviors that measure the dependent variable of "general change" (Cronbach's alpha .88). Perceived risk may positively link attitudes to behavior in that increased perceived risk may result in increased information exposure and attention to relevant information (Kronenfeld & Glik, 1988). Risk is measured as the sum of the behaviors that the respondent believed would increase exposure to AIDS or risk of getting AIDS. The fourth independent variable of interest is an assessment of one's "objective health." A "cue" to change, such as objective symptoms, is a factor within the HBM that is associated with preventive health behavior. Thus, the assessment of one's objective health status may serve as a "cue" to move one toward safer/healthier behavior change. Objective health status is a fourteen-item scale measured as the sum of illnesses for which the respondent was treated (Cronbach's alpha .30). Objective health status is coded so that higher scores indicate increased health problems. The fifth independent variable of interest is "stable relationship." Being in a stable relationship is associated with a lack of condom use which is an important window for the transmission of HIV, particularly if one's significant other exhibits other risky behaviors such as IV drug use. Moreover, being in a stable relationship may provide one with a false sense of security about avoiding contracting HIV since this goes against the beliefs or perceptions of those groups most recognized as being at high-risk (Kane, 1991). Stable relationship is a three-item variable that assesses whether the respondent is – or is not – in a stable, long-term relationship.

**Control Variables.** Any observed relationship between the independent variables and a general safer/healthier behavior change might be interpreted in any number of ways that are alternatives to those related to change behavior. This relationship might be accounted for in terms of the sheer number of behaviors that one has engaged in prior to hearing of HIV/AIDS. Those individuals who have engaged more frequently in behaviors that are among those that have possibly changed since hearing of HIV/AIDS are therefore capable of making a greater behavior change and thus might render the relationship spurious. To forestall this interpretation, we control on the number of items that had previously been engaged in by respondents [numdid]. The number of behavior items that respondents had ever engaged in is measured as the sum of the behaviors reported by the respondent (a theoretical range of 1 - 36).

We control for those in the high-risk category as those individuals might account for the general safer/healthier change in behavior. One such high-risk group that made substantial changes in the direction of safer behavior is members of the gay community, especially gay males. For example, in the early 1980s changes occurred in the decreasing numbers of gay bars and bath houses.

Changes also occurred in sexual practices (Feldman, 1990). Available evidence suggests that the threat of HIV disease transformed norms and attitudes toward protected anal sex. Norms and attitudes toward condom use changed toward acceptance with condom use perceived as normative and necessary (Prestage, 2001; Turner, Miller, & Moses, 1989). "Condom use reflects a major adaptation to the risk of AIDS among gay men" (Schiltz & Adam, 1995, p. 5). Three-quarters of those surveyed in 1993 described themselves as condom users (Schiltz & Adam). Recent reports suggest that attitudes within the gay community may be changing once again toward one of disregard for condom use (Harpaz, 1999). Individuals in the present analysis were categorized as being at high risk of contracting HIV if they were engaging in behaviors such as male homosexual behavior, heavy intravenous and illicit drug use, and habitual prostitution and/or solicitation.

We control on race, gender, and level of education as minority status, gender, and socioeconomic status are clearly implicated in the risk of contracting HIV. Race is not a cause of HIV disease, but minority groups are vulnerable to infection by HIV disease and the effects of HIV disease in ways that the majority population is not. Ethnic differences that moderate the relationship between high-risk factors and HIV disease are confounded with social class factors (Des Jarlais & Friedman, 1990). Because the minority community is disproportionately suffering from impoverished conditions such as homelessness, joblessness and so on, high-risk behaviors are more common than within the majority community. Because those in these minority communities are often difficult to locate, they are more difficult to target with prevention information. Moreover, because of poor education, they may be less able to pay attention to preventive information (Perrow & Guillen, 1990). Previous research has recognized the inability of women to negotiate sexual boundaries in terms of condom use (Guinan & Leviton, 1995; Hankins, 1993). Gender is measured as a dummy variable with male = 1, female = 0. Race/ethnicity is measured in terms of two dummy variables: "Black and Hispanic," with all others as the omitted category. Education level serves as a proxy for socioeconomic status and is measured by a single variable with 11 categories ranging from "no formal schooling" to "postgraduate degree," with higher step scores indicating higher levels of educational attainment.

***Interaction terms among Independent Variables.*** We believe that the predictors of "general change" are not adequately represented by simple, additive linear regression equations. Instead, we hypothesize that the strength of the independent variables may be related to the risk category to which one belongs. Therefore all possible interaction terms among the risk category (high versus low risk) and each independent and control variable were computed. The interaction terms are: male \* risk category, black \* risk category, Hispanic \* risk category, education \*

risk category, relationship status \* risk category, risk perception \* risk category, vulnerability \* risk category, discuss AIDS \* risk category, objective health status \* risk category, numdid \* risk category. These interaction terms were used in regression analysis with the independent and control variables regressed on "General Change."

## ANALYSIS

One Ordinary Least Squares regression model was estimated in which five independent variables, six control variables, and ten interaction terms predicted the dependent variable "General Behavior Change." The analyses were conducted using the statistical package STATA (Computing Resource Center, 2001) which automatically checks for identification and collinearity of coefficients.

The interaction effects contain dichotomous and ordinal variables. Interactions between dichotomous variables are appropriate in regression and differ from interactions involving measurement variables only in interpretation of the effect across groups rather than across continuous levels of a variable (Nichols, 1995).

A model including a higher order term should include the lower order main effects to prevent violation of the principle of marginality. Therefore, the use of interaction terms brings up issues of multicollinearity among independent variables since the interaction terms are linear products of two or more other variables in the model (Jaccard, Turrisi, & Wan, 1990). However, as previously mentioned, the statistical package used in this analysis is STATA, which automatically checks for identification and collinearity of coefficients (Computing Resource Center, 2001). Some researchers have questioned whether or not it is appropriate to interpret the main effects of an equation in the presence of significant interaction terms (Aiken & West, 1991; Smith & Sasaki, 1979). Other researchers believe that interpreting main effect coefficients should not be disregarded, because they regard them as meaningful and informative for understanding the relationships under investigation (Aiken & West, 1991; Finney, Mitchell, Cronkite, & Moos, 1984; Jaccard et al., 1990). In the presence of interaction terms (a multiplicative model), the main effects are estimates of conditional relationships, reflecting the assumption that all variables, except the one under consideration, equal zero. Thus, the main effects can be understood as average effects of the independent variable on the dependent variable across values of the moderating variable. This differs from a linear model in that the main effects estimate the effect of an independent variable on the dependent variable at each level of the independent variable under investigation (Jaccard et al., 1990).

## RESULTS

As indicated in Appendix B, the sample consisted of about 20 percent Black and 10 percent Mexican-Americans. The average education level of respondents falls between high school and college graduation, approximating the general population.

Ordinary Least Squares regression results for the factors regressed on the dependent variable “General Change” (to safer/healthier behavior change) are reported in Table 1.

**TABLE 1**  
**OLS REGRESSION RESULTS FOR PREDICTORS OF “GENERAL CHANGE,”**  
**INCLUDING COEFFICIENTS, STANDARDIZED COEFFICIENTS AND STANDARD ERRORS**

Dependent Variable = <b>General Change</b>			
INDEPENDENT VARIABLES:	b	Standard Error	$\beta$
Objective Health Status	-.097	.082	-.037
Discuss AIDS	.080**	.034	.065
Vulnerability	.080**	.033	.072
Risk Perception	.066***	.009	.205
Relationship Status	-1.829***	.166	-.300
Hispanic	.051	.273	.005
Black	.578***	.201	.079
Gender	.229	.165	.039
Risk Category (hi. vs. lo.)	-2.790**	1.243	-.457
Education Level	-.050	.060	-.025
NumDid	.081***	.020	.137
NumDid*Risk Category	.106***	.030	---
Obj.Hlth*Risk Category	.248**	.127	---
DiscussAIDS*risk category	.122**	.061	---
Vulnerability*Risk category	-.040	.054	---
Risk*Risk Category	.031*	.016	---
Relationship*Risk Category	-.310	.279	---
Education*Risk Category	-.027	.102	---
Hispanic*Risk Category	.014	.493	---
Black*Risk Category	.278	.414	---
Gender*Risk Category	.652**	.288	---
<hr/>			
<i>N</i> = 1429			
<i>Constant</i>	-1.527**	.755	
<i>Adjusted R</i> <sup>2</sup>	.302		
<i>Model F</i>	30.38***		

\*  $p < .05$  (one tailed) \*\*  $p < .05$  \*\*\*  $p < .01$

*Note:* There are no standardized scores for the interaction terms as this is not sensible.

Seven of the main effect coefficients were significant. Risk Category, vulnerability, and discuss AIDS are significant at the .05 level. Risk perception, the number of behaviors engaged in (numdid), relationship status, and Black are significant at the .01 level. Five of the interaction terms are significant. One interaction term (risk\*risk category) gained significance at the one-tailed criterion, while four category interaction terms (numdid\*risk, objective health\*risk, male\*risk, and the discuss AIDS\*risk) gained two-tailed significance. The interaction term numdid\*risk category was significant at the .01 level. Despite the significant interaction terms, several of the main effects involved in the interaction terms remained significant.

Individuals who discuss AIDS with others, who are experiencing a sense of vulnerability, and who possess an increased sense of risk that numerous behaviors increase one's risk of contracting HIV/AIDS are positively related to a general change to safer/healthier behavior. Moreover, as the number of behaviors that one engages in increases, so does the likelihood of a general change to safer/healthier behavior. In addition, Blacks are significantly more likely than are Hispanics and the omitted category to make a general change in behavior. Surprisingly, those who are in the high-risk category for contracting HIV/AIDS are significantly less likely than are those in the low-risk category to make a general change in behavior.

Figure 1 contains a graph depicting the significant interaction of the effect of the number of deviant behaviors engaged in by risk category (numdid\*risk category) on general change behavior. Low and high risk are graphed at three levels (low, medium, and high) of the numbers of behaviors engaged in by respondents.

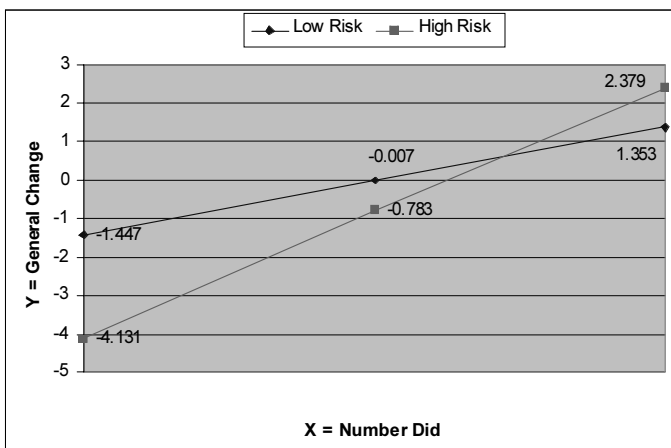


Figure 1: Graph of effect of interaction of Numdid and Risk Category (NumDid\*Risk Category) on General Change

As previously mentioned, “numdid” is a control variable since those individuals that have engaged in more frequent behaviors are capable of making a greater behavior change. Numdid is positively related to general change. The graph is best interpreted by examining increases and decreases in dependent variable scores at different levels of the independent variables which are interacting. This graph allows comparison of general change scores between the groups of individuals who engaged in either a low, medium, or high number of the behaviors measured, between those in the low-risk category versus the high-risk category. Figure 1 indicates a disordinal interaction between the number of behaviors engaged in and risk category. A disordinal, or crossover, interaction is one in which the regression lines intersect (Jaccard et al., 1990). Findings indicate that change behavior is differentially related to the number of behaviors engaged in [numdid] by risk category. For those in the high risk category, higher numbers of behaviors engaged in should have a positive impact on general change. As expected, as “numdid” increases the general change score for high-risk individuals diverges by becoming increasingly more positive from individuals in the low-risk group.

Figure 2 contains a graph depicting the significant interaction of the effect of objective health status by risk category (objective health\*risk category) on general change behavior. Objective health status is graphed at three levels (low, medium and high) of the numbers of illnesses for which the respondent was treated.

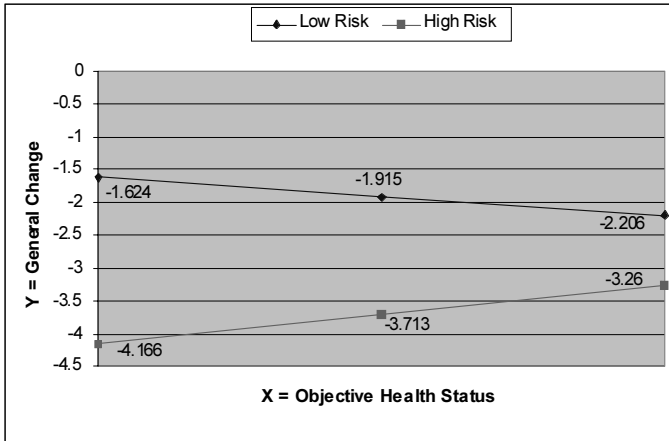


Figure 2: Graph of effect of interaction of objective health status and Risk Category (objhlth\*Risk Category) on General Change.

Findings indicate that low-risk individuals have higher change scores than do high-risk individuals at the low end of illnesses for which individuals were

treated [objective health status]. Figure 2 reveals that general change behavior decreases for individuals in the low-risk category as the number of illnesses for which individuals were treated increases. General change score increases for individuals in the high-risk category as the number of illnesses for which individuals were treated increases.

Figure 3 contains a graph depicting the significant interaction of the effect of discussing AIDS by risk category (Discuss AIDS\*Risk Category) on general change behavior. Low and high risk are graphed at three levels of Discussion of AIDS (low, medium, and high).

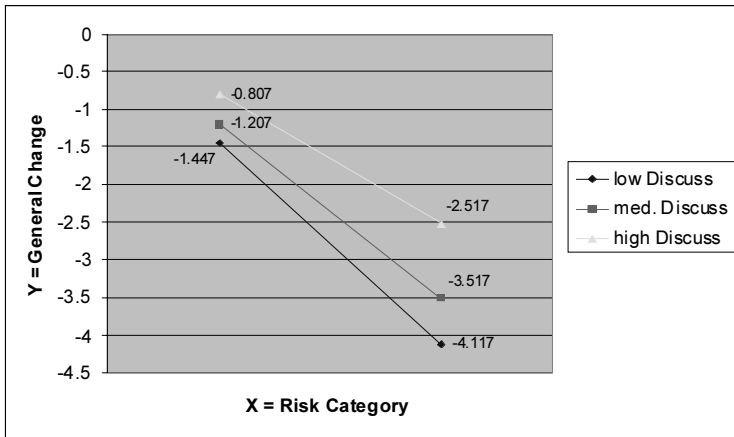


Figure 3: Graph of effect of interaction of Discuss AIDS and High Risk (Discuss AIDS\*High Risk) on General Change

Findings indicate that low-risk individuals have higher change scores than do high-risk individuals at all levels of the frequency with which one discusses AIDS with those in one’s social network. Figure 1 reveals that for those in both the low-risk and high-risk category general change behavior increases as the frequency of discussing AIDS increases. The increase in general change scores is most drastic for the high-risk individuals at the high frequency of discussing AIDS.

Figure 4 contains a graph depicting the significant interaction of the effect of perceiving that behaviors would increase exposure to AIDS or risk of getting AIDS by risk category (Risk\*Risk Category) on general change behavior. Low and high risk are graphed at three levels of one’s perception of risk regarding behaviors increasing one’s chance of getting AIDS (low, medium, and high).

Findings indicate that low-risk individuals have higher change scores than do high-risk individuals at all levels of risk perception. Figure 1 reveals that for those in both the low-risk and high-risk category general change behavior

increases as perceptions that behaviors would increase exposure to AIDS or risk of getting AIDS increases. The increase in general change scores is greatest for those in the high-risk category.

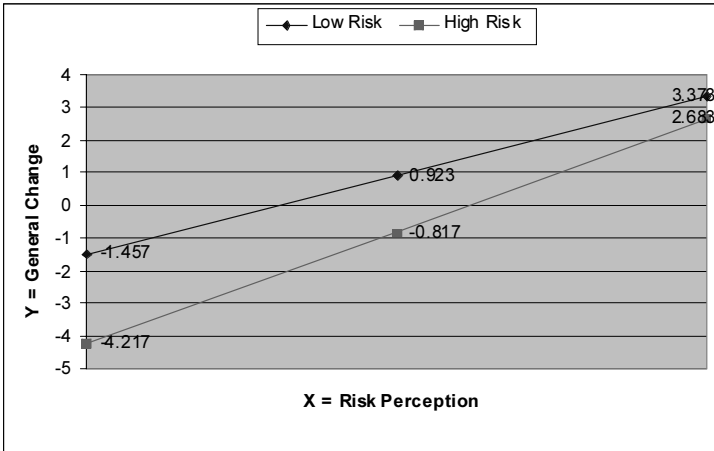


Figure 4: Graph of effect of interaction of Perception of Risk and Risk Category (Risk\* Risk Category) on General Change

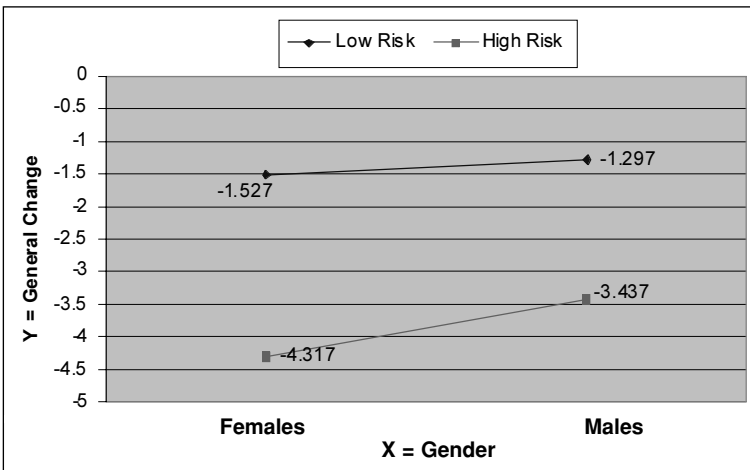


Figure 5: Graph of effect of interaction of Gender and Risk Category (Gender\* Risk Category) on General Change

Figure 5 contains a graph depicting the significant interaction of the effect of gender by risk category (gender\*risk category) on general change behavior.

The gender\*risk category interaction term is positively related to general change scores. Findings indicate that change scores for females in the low-risk category are slightly lower than are those for low-risk males. That is, there is a slight increase in general change scores for low-risk males. Findings also indicate that although change scores are lower for both males and females in the high-risk category versus the low-risk category, the general change scores for high-risk females are lower than are those for their male counterparts.

## DISCUSSION AND CONCLUSION

The interaction effects included in the present analysis reveal the complexity of predicting behavior change related to HIV/AIDS. As hypothesized, the strength of many of the independent variables is related to the risk category to which one belongs. However, although the interaction terms between vulnerability\*risk category, and black\*risk category are not significant, the main effects of perceiving a sense of vulnerability and being Black are significantly related to a general change toward safer behavior. This suggests that perceiving a sense of vulnerability and being Black are significant predictors of a general change to safer behavior regardless of one's risk category. In addition, the interaction term for relationship status\*risk category is not significant, but the main effect for relationship status is significant. Those in a long-term stable relationship, regardless of risk category, were significantly less likely to engage in changing their behavior. The negative effects of a long-term stable relationship on safe sexual behavior are supported in the literature (Buzwell & Rosenthal, 1996; Hammer et al., 1996; Kane, 1991; Laumann et al., 1994; Kordoutis et al., 2000).

The findings indicate that general change behavior decreases for individuals in the high-risk category at the medium and high levels of objective health status (Figure 2). Therefore, those in the high-risk category who were treated for medium and high levels of illness decreased their general change to safer behavior. However, general change behavior increases for individuals in the high-risk category for those treated for low levels of illness (low objective health status). These findings may provide support for the contention of Bauman and Siegel (1987) that the awareness of threat may lead individuals most at risk into a state of denial in which one's potential for contracting HIV is minimized or decreased to a manageable level. The awareness of one's vulnerability may motivate persons with HIV disease, at the individual level, to behave in ways which lead to the experiencing of a decrease in vulnerability (Bauman & Siegel, 1987). This would further support a positive self-concept. Kaplan (1986) contends that under circumstances of self-evaluation, individuals will experience self-feelings. "Self-evaluative responses are personal judgments of the extent to

which the person approximates desirable states” (Kaplan, 1986, p. 82). If an individual evaluates herself/himself negatively, these negative self-feelings will motivate the individual to behave in ways to experience positive self-feelings (Kaplan, 1986). Perhaps decreasing one’s general change behavior may be an attempt to deny the possibility that the illnesses experienced are related in any way to HIV disease. This motivation to behave in ways to experience positive self-feelings may also partially explain the relationship between one’s risk category and general change behavior.

The findings indicate that the general change scores for females are lower than those for males within both the low-risk and high-risk category (Figure 5). Perhaps a lower change score for females than for males mirrors the media’s focus on targeting males with preventive information. These findings may also support previous research that recognizes the inability of women to ensure their safety with regard to preventing HIV infection at least in terms of sexual behaviors. Due to societal notions of masculinity and femininity, females may be less able to negotiate sexual boundaries in terms of condom use (Guinan & Leviton, 1995; Hankins, 1993). These findings are especially troublesome since the proportion of women who are contracting HIV continues to increase annually (Centers for Disease Control and Prevention, 1996).

The findings indicate that the higher one’s frequency of discussing AIDS with those in one’s social network, the higher are one’s general change scores (Figure 3). As stated earlier, those in one’s social network may provide numerous health-related types of assistance (Berkman, 1984; Rodin & Salovey, 1989). Previous research examining communication factors related to HIV has tended to focus only on effective sexual communication and negotiation skills (Catania et al., 1994; Catania et al. 1990; DiClemente, 1991) rather than focusing on frequency of communication concerning HIV/AIDS as evidence of structural support from one’s social network.

The main effect finding that those in the high-risk category are less likely than are those in the low-risk category to make a general behavior change is contrary to a portion of the HBM since individuals are posited to comply with health behavior if they believe they are susceptible to a particular illness. Intuitively, this would seem to be the situation for those in the high-risk category. However, because individuals are motivated to behave in ways to experience positive self-feelings (Kaplan 1986), perhaps decreasing one’s general change behavior may be an attempt to deny the possibility that one’s engagement in high-risk behaviors has placed one at risk of contracting HIV. Alternatively, the findings may be due to the fact that many of our general change behaviors are irrational and are in response to behaviors that are not actually related to contracting HIV/AIDS. Fear regarding acquiring HIV disease through casual contact has been observed as a general cultural response to the disease (Herek, 2002). Underlying this attitude is

a cultural disposition to overemphasize the transmissibility of a disease as well as the role by inanimate objects in spreading infection:

An epidemiologist's understanding of the transmission of infectious disease is much different from a lay person's, and is characterized by the classification of disease agents into specific categories such as fecal, oral, respiratory, vector borne, sexually transmitted. For many lay persons, disease is classified in a much more differentiated way, that is, contagious, and not contagious. Thus once AIDS becomes glossed as "contagious" it may be spread in all sorts of ways, even if it is understood to be "not very contagious" (McCombie, 1990, p. 19).

According to present findings, Blacks are significantly more likely than are Hispanics and whites (the omitted category) to make a general change in behavior. This is contrary to other research examining safer sex behaviors (Steers, Elliott, Nemiro, Ditman, & Oskamp, 1996). Not only are Blacks and Hispanics at a disproportionate risk of contracting HIV (Centers for Disease Control and Prevention, 1992), they are also less knowledgeable about behaviors that increase one's risk of contracting HIV/AIDS (Miller, Turner, & Moses, 1990). Perhaps the greater likelihood of Blacks compared with whites making a general change in behavior may be a result of the lack of accurate knowledge among Black people concerning factors that predict an increased likelihood of transmission (Langer, Zimmerman, & McNeal, 1992). Perhaps the more behaviors that Blacks mistakenly believe will reduce their risk of HIV infection, the greater their general change score. Although, the lack of knowledge of the transmission of HIV is similar for Hispanics, we did not find a significant relationship between being Hispanic and general change behavior.

The present findings suggest that several of the factors within the HBM are predictive of a general change in behavior. These health belief factors are vulnerability and perception of risk. This is especially noteworthy since our measures are much more inclusive than were prior measures employed in research employing health belief factors. The present analysis finds that such additional factors as participation in social networks, as measured by the frequency with which one discussed AIDS with those in one's social network, and relationship status are factors that are significantly related to a general change to safer behavior. Furthermore, we examine complex interaction effects because HIV/AIDS related behaviors involve complex social processes. As hypothesized, the strength of several of the independent variables is related to the risk category to which one belongs.

The present analysis improves upon much prior research as it includes both those in high-risk and low-risk categories. The significance of such research lies in the fact that ultimately restricting the transmission of the HIV disease is

dependent upon knowing the factors that contribute to changing behaviors in individuals and how those factors are augmented by moderating effects such as one's risk category. A limitation of the present research is that we examined "general change" which does not reveal the predictors of change related to those specific sexual and drug behaviors known to be related to HIV transmission. However, the predictors of change related to specific sexual and drug behavior related to the transmission of HIV comprise our future research agenda.

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## Appendix A

### Scales Used In This Study

**List of 36 Change Behavior Activities** - Since you first heard about the threat of AIDS, whether or not you think the activity has anything to do with AIDS, tell me if you are doing it: More often; Less often; Neither more nor less often, but have been doing it with more caution; Has there been no change; Have you never done it. Higher scores indicate greater safe/healthful change behavior.

1. Smoking tobacco
2. Drinking alcohol heavily
3. Smoking marijuana
4. Sharing a razor
5. Sharing a toothbrush
6. Giving blood
7. Casual kissing, on the cheek, for example
8. Intimate kissing
9. Hugging
10. Shaking hands
11. Eating out in a restaurant that may have gay employees
12. Intimate heterosexual sexual contact
13. Intimate homosexual sexual contact
14. Using inhalants, for example, nitrates and "poppers"
15. Illegal intravenous drug use
16. Sharing needles or "works" with friends during illegal intravenous drug use
17. Sharing needles or "works" with strangers, shooting up in a gallery, for example
18. Sharing food, drinks, or eating utensils with a gay male
19. Sharing food, drinks or eating utensils with someone who has AIDS
20. Sex without condoms
21. Anonymous sex, sex with a stranger
22. Being promiscuous, having sex with many different people
23. Going to a prostitute or gigolo
24. Having sexual intercourse with an illegal intravenous drug user
25. Heavy use of illegal drugs other than intravenously
26. Taking antibiotics
27. Using public toilets
28. Using public showers
29. Exchanging body fluids such as saliva during sex
30. Exchanging body fluids such as swallowing sperm during sex
31. Exchanging body fluids such as allowing ejaculation into your anus during sex
32. Sex without spermicidal foam
33. Sharing needles or "works" washed with soap and water
34. Sharing "works" washed in alcohol or Clorox
35. Sharing "works" boiled between use
36. IV drug use, even with new needles

**Vulnerability** - For each of the following statements, tell me if you *strongly agree* (coded 3), *agree* (coded 2), *disagree* or *strongly disagree* (1).

1. I find that I am often aware of various signs of illness or other symptoms happening to me (my body).
2. I often have symptoms of very serious illnesses.
3. Other people's illnesses bother me.
4. I think there is something seriously wrong with my body.
5. I am afraid of illness.
6. In general, people who have poor health just haven't taken very good care of themselves
7. I have many doubts about some things doctors say they can do for AIDS

**Discuss AIDS** - (No = 0; Yes = 1)

Have you discussed the AIDS health threat with:

1. Your (spouse/sexual partner)?
2. Your father?
3. Your mother?
4. A sister?
5. A brother?
6. A close friend?
7. A health care worker?
8. A physician?
9. A co-worker

**Risk** - I am going to read a list of activities (36 items listed above under "general change"). For each, tell me if you think it increases risk of exposure to AIDS or risk of getting AIDS. Since we are interested in what you believe, there are no right or wrong answers. Just tell me what you think. Would (1-36) increase risk (*Not at all* = 0; *Definitely* = 1)

**Objective Health** - How often were you treated for the following problem in 1980-1987? (*Never* = 0; *One to nine times*, *Ten times to once a month*, *Once a week*, *More than once a week* = 1):

1. Asthma
2. Chronic bronchitis, emphysema, pneumonia.
3. Allergies
4. Hepatitis A or jaundice
5. Hepatitis B
6. CMV (cytomegalovirus) infection
7. EBV (Epstein-Barr virus, adult mono) infection
8. Cirrhosis of the liver
9. Anemia
10. Diabetes
11. Arthritis or gout
12. Cancer of any type
13. Sexually transmitted disease
14. Psoriasis

**Stable Relationship** - (coded 1 if any one of the following three items was answered affirmatively, and 0 if all 3 were answered negatively):

1. Are you currently:  
Married and living with your (wife/husband)?

2. Are you in a long-term relationship with a person of the opposite sex - someone to whom you are not married, but have lived with for a long time or expect to live with for a long time sharing an essentially “married” life?
3. Are you in a long-term relationship with a person of your same sex - someone with whom you lived with for a long time or expect to live with for a long time sharing an essentially “married” life?

**NumDid** - Measured by adding the number of the 36 items listed above under “general change” that the respondent had engaged in prior to hearing of HIV/AIDS. The higher scores represent the greater ability one has to make changes in one’s behavior.

**Risk Category** - (coded 1 for “High Risk” if any one of the following items was answered affirmatively, and 0 for “Low Risk” if all 4 were answered negatively)

Have you ever...?

1. [If respondent is male] Engaged in sex with a person of your own sex two or more times a week over a two-month period?
2. Engaged in pimping or prostitution 3 times or more in the same week?
3. Used heroin daily or almost daily for at least 2 weeks?
4. Used drugs other than marijuana illegally or used any illegal drugs other than marijuana including LSD or other hallucinogens, amphetamines, barbiturates, tranquilizers, inhalants, heroin, or other opiates, cocaine, qualudes, and freebase daily or almost daily for at least two weeks?

## Appendix B

### Summary of Descriptive Statistics of Variables

Variables	Mean	Range	Standard Deviation
Black	.20	0-1	.40
Hispanic	.10	0-1	.29
Education Level	7.60	1-11	1.43
Relationship Status	.65	0-1	.48
Gender	.51	0-1	.40
Risk Category	.34	0-1	.47
NumDid	17.46	0-36	4.96
Risk Perception	34.39	0-70	8.98
Vulnerability	7.93	0-16	2.61
Discuss AIDS	3.67	0-9	2.37
Objective Health Status	1.10	0-7	1.12