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How Perceptions of Mortality and HIV Morbidity Relate to Substance Abuse Problems and Risky Sexual Behaviors among Former Juvenile Offenders¹

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Abstract

This study investigates whether high-risk young adults' perceptions of their likelihood of living to age 35 and of acquiring HIV are related to their substance abuse problems and risky sexual behaviors. The sample consists of data from the 72 and 87-month follow-up assessments of 449 juvenile offenders referred to probation in 1999 and 2000. Results indicate that believing one is likely to get HIV is associated with having more concurrent substance use problems and engaging in more risky sexual behaviors. Longitudinal analyses indicate that youth who think they are likely to get HIV are at greater risk for later substance abuse problems and risky sexual behaviors, though these results are only marginally significant. The results demonstrate that respondents are aware of some of the risks associated with their recent substance using and sexual behaviors, but that holding these perceptions does not result in a reduction of these behaviors.

Introduction

HIV and substance abuse are prominent health concerns for young adults in the United States. HIV diagnoses among 20-24 year-olds are increasing, with almost 4,000 young adults diagnosed in 2006 (Center for Disease Control and Prevention, 2008). Young adults also have higher rates of substance dependence/abuse than either teenagers or older adults (Substance Abuse and Mental Health Services, 2007). The risk of contracting HIV or having substance abuse problems as a young adult may be elevated for youth who have had contact with the juvenile justice system. Juvenile offenders exhibit high rates of risky sexual behaviors (Cranbury et al., 1995; DiClemente, 1991; Morris, Baker, Valentine, & Pennisi, 1998; Teplin, Mericle, McClelland, & Abram, 2003), and problems related to substance use and abuse during adolescence (Aarons et al., 2001; McClelland, Elkington, Teplin, & Abram, 2004). However, less is known about how former juvenile offenders fare on these outcomes once they reach young adulthood. The present study investigates whether former juvenile offenders' perceptions concerning their future mortality and morbidity relate to their concurrent behaviors and also whether their perceptions influence or predict their future behaviors.

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Health behavior models stress the importance of *perceived susceptibility*, the belief that one is at risk for a negative health outcome, on people's health behaviors. Although these health behavior models present different frameworks for understanding the adoption of preventative (or the avoidance of risky) health behaviors, the Health Belief Model (Janz & Becker, 1984; Rosenstock, 1974; Rosenstock et al., 1988), Protection Motivation Theory (Rogers, 1983), and the Precaution Adoption Process (Weinstein, 1998) all identify perceived susceptibility (or vulnerability) as an important health cognition (Rogers, 1983; Weinstein, 1988, 1993). These theories generally predict that perceived susceptibility should motivate people to reduce health risks by either engaging in preventative health behaviors (e.g., safe sex practices) or avoiding risky behaviors (e.g., unprotected sex; Weinstein, 1993). However, since motivation to change behavior is dependent on perceiving oneself as being at risk, people's perceptions need to reflect their current behavior (Weinstein & Nicolich, 1993; Gerrard, Gibbons, & Bushman, 1996). That is, if people are currently engaging in risky behaviors, then their perceptions of risk should be high, whereas perceptions of risk should be low if engaging in preventative behaviors.

There is evidence from meta-analyses and reviews that perceived susceptibility to negative health outcomes predicts the adoption of preventative behaviors (Janz & Becker, 1984; Harrison, Mullen, & Green, 1992; Milne, Sheeran, & Orbell, 2000; Brewer et al., 2007). For instance, Brewer et al. (2007)'s meta-analysis of 34 studies demonstrated that the more susceptible that adult participants felt they were to a disease, the more likely they were to obtain a vaccination for that disease. However, evidence is mixed regarding whether perceived susceptibility to HIV predicts adoption of preventative and desistance from high-risk behaviors (Janz & Becker, 1984; Gerrard et al., 1996; Kowalewski, Henson, & Longshore, 1997; Rosenstock, Strecher, & Becker, 1994). With a few exceptions, meta-analyses and reviews (Janz & Becker, 1984; Gerrard et al., 1996; Kowalewski et al., 1997; Rosenstock et al., 1994) have indicated support for a cross-sectional association between perceptions and behaviors, such that both adults and adolescents' assessments of their perceived vulnerability to contracting HIV are based on their recent preventative and risky sexual behaviors. However, there are very few longitudinal studies that have investigated whether believing that one is vulnerable to HIV leads to an increase in future protective behaviors or a decrease in risky behaviors. These studies (primarily on high risk samples) do not find a significant relation between perceived susceptibility and future behaviors, after controlling for previous behaviors (Gerrard et al., 1996).

The present study investigated the relation of former juvenile offenders' perceptions of their own mortality and HIV-related morbidity with substance use problems and risky sexual behavior. The sample was comprised of juvenile probationers in Los Angeles who have been followed into young adulthood. We examined the relationship between perceptions and behaviors both cross-sectionally and longitudinally to determine (1) if there was an association between former juvenile offenders' current behaviors and their perceptions of their future mortality and morbidity, and (2) if these perceptions of their mortality and morbidity were associated with a decrease in their future problem behaviors. Testing these hypotheses on a sample of former adolescent offenders may provide important insights for how treatments and interventions targeting health-related perceptions can result in positive changes in health behaviors for high-risk groups.

Methods

Participants

The study sample is composed of adolescent offenders in Los Angeles who were adjudicated and sent to group homes between February 1999 and May 2000. All recruitment and study procedures were approved by the juvenile court, the probation department, and RAND's

Institutional Review Board. Interviewers approached all adolescent offenders who were sent to one of seven residential group homes in Los Angeles. One of the group homes, which focused on substance abuse treatment, was oversampled due to the overall study focus on evaluating substance abuse treatment services at this facility (for more details, see Morral, McCaffery, & Ridgeway, 2004). Adolescents were interviewed face-to-face at intake and three additional times in the first year, and then again at 72 and 87 months post-intake. To be included in the study, youth had to be between the ages of 13 through 17, provide written informed assent, and allow for a parent/legal guardian to be notified of their participation in the study. Of the 574 deemed eligible, 125 were excluded because they were sent to the group home before they could be interviewed, they did not sufficiently understand English, or a parent/legal guardian asked that his or her adolescent not be included in the study. The final sample of 449 adolescents was predominantly male (87%), and the majority were Hispanic (55%). The mean age at baseline was 15.51 ($SD = 1.18$).

The present investigation uses data from the 72 and 87 months follow-ups, when respondents were in their early twenties ($N_{72\text{ months}} = 365$, $N_{87\text{ months}} = 383$). There was high retention at both 72 and 87 months (81% and 85%, respectively), not accounting for respondents who had been confirmed dead (18% of the missing subjects at 87 months).

Instrument and Measures

All interviews were conducted in English with the Global Appraisal of Individual Needs (Dennis, 1998). Table 1 provides descriptive information for each measure that was used at baseline (if applicable), 72 months, and 87 months.

Outcomes—The present study's outcomes are substance abuse problems and risky sexual behavior. Substance abuse problems were assessed with the Substance Problem Scale (SPS), which is comprised of sixteen questions and is a composite count of substance abuse and dependence symptoms (Range: 0 to 16) over the previous month, as listed in the Diagnostic and Statistical Manual of Mental Disorders IV (APA, 1994). The scale includes items that assess whether respondents' substance use interfered with their daily life (including medical, psychological and legal problems), as well as assessing symptoms of substance dependence. Two examples of SPS items include a measure of whether respondents' drug use caused them to have repeated problems with the law and whether their drug use caused them to have problems at work, school, or at home. The SPS had a high level of reliability at both 72 and 87 months (Cronbach's $\alpha = .92$ for both waves).

The Sexual Risk Scale (SxRS) is comprised of 12 items asked only of those youth who report engaging in "any kind of sex (vaginal, oral, or anal) with another person" in the past 90 days, and is a count of sexual behaviors (Range: 1 to 12) occurring over the previous three months that may place respondents' at risk for sexually transmitted infections or other complications. The SxRS includes items that assess whether respondents were engaging in unprotected sex and engaging in sexual activities while under the influence of alcohol and/or drugs. This index of risky sexual behavior has an interclass correlation coefficient of .76 over time (Modisette, Hunter, Ives, Funk, & Dennis, 2009).

Primary Predictors—The aim of the present study is to examine whether there is a relation between respondents' perceived susceptibility and their participation in these risky behaviors. As previous research has demonstrated that a number of adolescents' judgments of the expected likelihood of an event occurring predict future life outcomes (Bruine de Bruin, Parker, & Fischhoff, 2007), respondents' expectations of experiencing death and disease provided the measures of perceived susceptibility in this study. At both 72 and 87 months, respondents were asked about their expectations concerning their mortality and of

contracting HIV. Specifically, respondents were asked, “How likely is it that each of the following things will happen to you?” For mortality, respondents reported their perceived likelihood for the statement, “You will live to the age of 35.” For HIV morbidity, respondents reported their perceived likelihood for the statement, “You will get HIV or AIDS.” For each, respondents indicated how likely it was that each event would occur in their lives (not likely, possible, very likely, or already happened).

For these two questions, we created a dichotomous measure of likelihood (not likely vs. likely). The “possible” response was coded as a pessimistic expectation in both instances, which meant that it was grouped with “not likely” for the positively-framed mortality perception, and with “very likely” for the HIV morbidity question. We dichotomized the categories due to low number of respondents endorsing the “not likely” to live to 35 and “very likely” to get HIV categories.²

Additional Covariates—A number of covariates were relevant to both the outcomes (substance abuse problems and risky sexual behavior) and predictors (perceptions about the future) of interest and were included in our regression models. The Depressive System Scale (DSS) contains items related to nine depressive symptoms found in the DSM-IV (APA, 1994) and was included as a covariate, as studies have demonstrated that depressive symptoms can be co-morbid with substance abuse disorders amongst adolescents generally and juvenile offenders specifically (e.g., Abram, Teplin, McClelland, & Dulcan, 2003; Kilpatrick, Ruggiero, Acierno, Saunders, Resnick, & Best, 2003). The DSS had good internal reliability at both 72 and 87 months (Cronbach’s $\alpha = .84$ and $.85$, respectively). In addition, respondents’ self-report about their physical health (ranging from excellent to poor), their age of first sexual experience (vaginal, oral, or anal), and their frequency and recency of needle use (including sharing needles; Needle Frequency Scale, NFS) were included. These four measures, along with respondents’ basic demographics (age at interview, gender, and race) were included as covariates in all models.

Analytic Strategy

We first estimated the cross-sectional association between respondents’ perceptions of mortality and contracting HIV on both sexual risk and substance problem outcomes while controlling for the covariates listed above. For this aim, we fit regression models to each of our outcomes where the outcome of interest as measured at time t (72 or 87 month follow-up) was regressed on respondents’ perceived likelihood of living to 35 and contracting HIV at time t , and the other covariates. Since the cross-sectional models concatenated data from both the 72 month and 87 month data collection waves, an indicator of the interview wave was also included and robust variance estimation was conducted to account for clustering of multiple observations from the same individual (Williams, 2000).

Our second aim was to assess the longitudinal association of perceptions of mortality and contracting HIV on subsequent substance use problems and risky sex while controlling for the covariates described above and lagged measures of each outcome. In these models, 87-month outcomes (Time 2) were regressed on the independent variables from the 72-month assessment (Time 1) (e.g., our control covariates listed above as well as lagged outcome measures). For the SxRS models, the lagged construct of SxRS was composed of two variables: an indicator of recent sexual activity at 72 months and the interaction between this variable and respondents’ sexual risk behavior at 72 months.

²At the 87-month interview, one respondent indicated that he had contracted HIV (answered “already happened”). This respondent was not included in the analyses.

At both 72- and 87-months, the SPS was characterized by a large proportion of zero values (51% and 54%, respectively). These values indicated persons who did not report symptoms of dependence or abuse in the past month, but who may have been using substances during this time. To account for this preponderance of zeros, we used the zero-inflated negative binomial regression (ZINBR) model (Lambert, 1992; Long & Freese, 2006) to examine the cross-sectional and longitudinal association between perceptions and SPS. ZINBR models assume there is a latent variable underlying the distribution of SPS which determines whether or not a youth comes from an *Always Zero* distribution (where SPS would always equal 0 and thus the youth would always report no substance abuse problems) or from a negative binomial distribution (i.e., a *not Always Zero* distribution where SPS may take on a zero value with probability determined by the estimated parameter values of the negative binomial distribution). The ZINBR model presents two sets of coefficients to describe the association between the independent variables and the outcome: (1) binary model output which shows how the independent variables predict group membership in the *Always Zero* group (i.e., the group who always reports no substance abuse problems) vs. the *not Always Zero* group (i.e., the group that can report either no or some substance abuse problems) and (2) count model output that characterizes the relation between each independent variable with SPS when it is generated from the negative binomial distribution (i.e., the *not Always Zero* group's distribution).

In the case of the SxRS, we employed a two-step regression model for both our cross-sectional and longitudinal analyses to account for the fact that only youth who were sexually active in the past 90 days prior to follow-up were asked the questions for the SxRS. We first fit a logistic regression model that predicted *any* sexual activity in the past 90 days among all respondents. We next fit a Poisson model that predicted the count of risky sex behaviors among those who were sexually active in the past 90 days.³

Results

Substance Abuse Problems

Cross-sectional Analysis—The coefficient estimates from both components of the cross-sectional, multivariate ZINBR model for substance abuse problems are presented in the first column of Table 2. Thinking that one is likely to get HIV decreases the odds that a person will always report no substance abuse problems by a factor of 0.22 ($p = .02$) and increases the expected degree of substance problems a person experiences by a factor of 1.62 ($p = .001$), with all other variables held constant. Perceived mortality was not associated with respondents' reports of substance use problems.

Longitudinal Analysis—The estimates from the longitudinal, multivariate model for SPS are presented in the second column of Table 2. The negative association between the HIV likelihood perception at Time 1 and always reporting no substance abuse problems at Time 2 was not significant ($e^b = 0.26$, $p = .15$). There was also no significant relation between thinking that one is likely to get HIV at Time 1 and their degree of substance abuse problems at Time 2 ($e^b = 1.29$, $p = .33$). Additionally, perceived mortality was not associated with respondents' reports of substance use problems.

Risky Sexual Behaviors

Cross-sectional Analysis—The first column of Table 3 shows the cross-sectional associations for both the logistic and Poisson regression models for SxRS. There was a

³Tests for over/under dispersion in these models indicated that a poisson model provides a good fit (deviance/df: cross-sectional: 0.47; longitudinal: 0.57).

nonsignificant trend toward a positive association between thinking one was likely to get HIV and the probability of recently engaging in sexual activities (Odds Ratio (OR) = 1.90, $p = .11$). More importantly, among those who were sexually active in the past 90 days, thinking that one is likely to get HIV increases the expected amount of risky sex a person has by a factor of 1.41 ($p < .0001$), with all other variables held constant. Perceived mortality was not associated with respondents' reports of risky sex.

Longitudinal Analysis—The estimates for the longitudinal, multivariate models are presented in the second column of Table 3. After controlling for all other covariates including respondents' sexual risk at Time 1, thinking that one is likely to contract HIV at Time 1 makes it over four times more likely that a person will be recently sexually active at Time 2 (OR = 4.16, $p = .02$). However, thinking that one is likely to get HIV at Time 1 is not significantly associated with the amount of risky sex a person has at Time 2 (Incident Rate Ratio (IRR) = 1.18, $p = .27$). Perceived mortality was not associated with respondents' reports of risky sex.

Predicted Probabilities

We calculated marginal predicted probabilities to aid in the interpretation of our regression models. These probabilities were calculated based on the perceived likelihood of getting HIV for a reference individual: a 22 year-old Hispanic male, with no depressive symptoms, in self-reported excellent physical health, had his first sexual experience at age 13, had little to no needle use, and thought he was very likely to live to the age of 35 (categories determined from the largest grouping for each predictor, see Table 1). We estimated the difference in these two sets of predicted probabilities, and used a bootstrap procedure to estimate 95% confidence intervals (CI) for this difference.

Substance Abuse Problems—The predicted probability that a referent individual who thinks he will get HIV will always report no substance abuse problems (predicted probability PP = 0.31) is less than half that of the referent individual who thinks it is unlikely that he will contract the disease (PP = 0.65). As illustrated in Figure 1, the predicted probabilities for an individual who thinks he will get HIV are higher across the entire SPS scale than for one who thinks it is unlikely that he will contract the disease, a difference that is statistically significant (i.e., 95% CI did not include 0) for values of SPS greater than 2.

Risky Sexual Behavior—The referent individual who thinks it is likely that he will get HIV is less probable to report lower levels of risky sex than one who thinks it unlikely. However, this association reverses for scores on the SxRS above 4: the referent individual who thinks he will get HIV has a higher probability of having larger SxRS scores (i.e., more risky sex) than one who does not think he will get HIV.

Discussion

This investigation focused on two questions: (1) Is there an association between former juvenile offenders' current behaviors and their perceived future mortality and morbidity?, and (2) Are these perceptions associated with a decrease in their future problem behaviors? Overall, the present results provided support for the first question but not the second. For the perceived likelihood of contracting HIV, these analyses demonstrated that respondents were aware of the risks associated with their current behaviors: respondents who thought they were likely to contract HIV reported more problem behaviors in the previous three months than those who did not think they were likely to contract HIV. The present findings are consistent with previous research which has demonstrated that people use their current behaviors to inform their perceived susceptibility judgments with regard to HIV (Janz &

Becker, 1984; Gerrard et al., 1996; Kowalewski et al., 1997; Rosenstock et al., 1994). However, we note that due to the cross-sectional nature of these analyses, these results also may be indicative of the opposite relationship between perceptions and behaviors. That is, respondents' perceptions of their future likelihood of contracting HIV may be influencing their current engagement in risky behaviors.

Conversely, the longitudinal results do not support the hypothesis of a decrease in problem behaviors at Time 2 for those who viewed themselves as likely to contract HIV at Time 1. In fact, the longitudinal associations, although not significant, were in the opposite direction: when former juvenile offenders saw themselves as likely to get HIV at Time 1, this perception resulted in *more* problem behaviors at Time 2. Post-hoc analyses indicated that we were only powered to detect odds ratios less than or equal to 0.24 for the binary component of the ZINBR model of SPS and that we were only powered to detect incidence rate ratios greater than or equal to 1.45 for the Poisson model of SxRS (both at $p = .05$ and $b = .80$). Therefore, it remains unclear whether the lack of significance was due to insufficient power or due to lack of an association between the perception and the behaviors. Future research that is powered to detect more modest associations is needed to determine which of these explanations is correct.

These results are the first to suggest the possibility of a positive, longitudinal relation between perceived susceptibility to HIV and risk behaviors. One intriguing explanation for this possibility of a positive association is that among these former juvenile offenders, those who believe that they are likely to get HIV view their contracting of the disease as inevitable. That is, even though they are aware that these behaviors make them vulnerable to HIV (as the cross-sectional results demonstrate), they may not believe that they have the self-efficacy to stop this negative health outcome from occurring (cf., Stretcher, DeVellis, Becker, & Rosenstock, 1986). The perception of inevitability, then, might actually discourage some from abstaining from risky or adopting preventive behaviors, because they do not believe they have the ability to bring about the desired outcome (i.e., not contracting HIV). Indeed, health behaviors models including the Health Belief Model and the Extended Parallel Process Model have stressed the importance of *both* perceived susceptibility (i.e., recognizing that current behaviors put one at risk) and self-efficacy (i.e., believing that one can implement the changes in behavior necessary to reduce risk) in motivating long-term, health-related behavior change (Rosenstock et al., 1994; Stretcher et al. 1986; Witte & Allen, 2000). This inevitability account provides one possible explanation for why at-risk youths might engage in more future risky behaviors if they believe they are more susceptible to contracting HIV (if this finding can be found in future samples that have sufficient power to detect this possible association).

Another question raised by the present research is why the perceived likelihood of contracting HIV was significantly associated with both outcomes in cross-sectional analyses, whereas the perceived likelihood of living to 35 was not. Perceptions of mortality and morbidity in the present study differ on a number of dimensions. Whereas the perceived likelihood of contracting HIV is a negative, specific outcome, on which there are only a few causes that could lead to the contracting the disease, which are predominantly under the individual's control (e.g., engaging in high risk sex), the perceived likelihood of living to the age of 35, is a positive, general outcome, on which there could be many causes that could lead to this outcome, some of which are not all under the individual's control (e.g., crime victimization).

These differences tap valence, specificity, and locus of control considerations, which all have established associations with health-related behaviors (e.g., Rosenstock et al., 1994; Rothman & Salovey, 1997; Steptoe & Wardle, 2001). Any or all of these differences

between the two perceptions could have led to the perceived likelihood of HIV being the significant predictor. For instance, studies on health locus of control have identified three causal stories through which people can view their health outcomes (e.g., Steptoe, & Wardle, 2001; Wallston, Wallston, & DeVellis, 1978). Their outcomes can be a result of their own behavior, another person's behavior, or external forces (such as chance). If respondents' viewed their likelihood of living to 35 as determined by external factors that they could not personally control (such as being shot), then this view may explain why it was not predictive of their health-related behaviors. In addition, adolescents in general tend to overestimate their likelihood of dying in relation to the actual mortality rate (Bruine de Bruin et al., 2007; Fischhoff, Bruine de Bruin, Parker, Millstein, & Halpern-Felsher, in press), which may have also made their expectations concerning their mortality less effective as a predictor.

There results of this study should be considered alongside certain limitations. First, these results relied on respondents' self-reports, which may be biased (e.g., social desirability concerns). Second, the sample was not designed to be representative of all youths, nor of all former juvenile offenders, in the Los Angeles area. Former juvenile offenders differ from their young adult counterparts who have not had contact with the juvenile justice system on a number of personality characteristics, including impulsivity and negative emotionality (Loeber et al., 2003), and as such the relationship between perceptions and behaviors may be different for these two groups.

Given that juvenile offenders have been shown to participate in more risky behaviors (Aarons et al., 2001; Cranbury et al., 1995; DiClemente, 1991; McClelland et al., 2004; Morris et al., 1998; Teplin et al., 2003), and are likely to be more sensation-seeking than non-offending adolescents (Newcomb & McGee, 1991), their transition to young adulthood may include a more accepting attitude toward engaging in behaviors that would put their health and their lives at risk. Therefore it may be that these respondents place more value on the excitement that risk-taking provides than the negative health outcomes that may result from engaging in risky behaviors. Future research that examines differences between young adults who were juvenile offenders and ones who were not would help in understanding whether and why these groups differ in their perceptions of and engagement in risky health behaviors, and how best to encourage avoidance of risky health behaviors through treatments and interventions for both of these groups.

Implications for Practice

These results point to a bi-directional cross-sectional relationship and a potentially positive longitudinal association between former juvenile offenders' perceptions of future morbidity and problem behaviors. With respect to interventions, these findings suggest that those programs that target perceptions (and cognitions more generally) may provide an effective means of influencing behaviors, at least in the short term. Indeed, there are a number of interventions that the Center for Disease Control has cited as "Best-Evidenced Interventions" (Center for Disease Control, 2007) that are based on theories which stress the influence of perceptions on behaviors (Azjen & Fishbein, 1985). In addition, these findings support interventions that target multiple behaviors (rather than only one: Flay et al., 2004), as the perceived likelihood of contracting HIV was associated with both substance abuse problems and risky sexual behaviors.

These findings also indicate that assessing people's perceptions may serve as a useful diagnostic tool to target interventions toward those in most need. Respondents who viewed themselves as likely to contract HIV were engaging in more risky behaviors than their counterparts with regard to both substance abuse problems and risky sex. Thus, in venues

where asking about sexual or substance abuse problems themselves may be problematic, assessing who holds these perceptions can help identify those who are at greatest risk. Previous research highlights the importance of message framing to the adoption of health behaviors (Rothman, Bartels, Wlaschin, & Salovey, 2004), and of matching message framing to individual characteristics (Prochaska et al., 1994), and such messages should also consider people's perceptions.

Former juvenile offenders may have a particularly difficult transition to young adulthood, given that as adolescents, they participate in higher levels of risky behaviors than their non-offending counterparts. The present research indicates that these former juvenile offenders are aware of the risks their behaviors present in young adulthood, but that they do not use these perceptions of their susceptibility to HIV to decrease their problem behaviors.

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Figure 1.
Cross-Sectional Predicted Probabilities for all Substance Problem Scale Values

Table 1

Descriptive statistics at Baseline, 72 Months, and 87 Months

	Baseline (N = 449)	72 Months (N = 365)	87 Months (N = 383)
Age	15.51 (1.18)	21.47 (1.63)	22.79 (1.24)
Female	13%	14%	14%
Ethnicity			
Hispanic	55%	55%	54%
Black	15%	15%	15%
White	16%	16%	16%
Other	14%	14%	15%
Sexual Risk Scale ⁴		3.04 (1.43)	2.97 (1.54)
Sexually Active in Previous 3 Months		66%	64%
Age of First Sexual Experience		13.69 (2.65)	13.67 (2.40)
Needle Frequency Scale ⁵			
Zero/Low		86%	87%
Mid		11%	12%
High		3%	1%
Substance Problem Scale ⁶	2.70 (4.02)	2.26 (3.63)	2.26 (3.72)
Perceived Likelihood of Living to 35			
Not Likely		5%	3%
Possible		34%	33%
Very Likely		61%	64%
Perceived Likelihood of Getting HIV			
Not Likely		88%	89%
Possible		11%	10%
Very Likely		>1%	1%
Depressive Symptom Scale ⁷	2.18 (1.89)	2.23 (2.53)	1.97 (2.50)
Physical Health			
Excellent	19%	33%	27%
Very Good	21%	17%	26%
Good	37%	31%	27%
Fair	17%	16%	17%
Poor	5%	3%	3%

⁴The Sexual Risk Scale is composed of 12 items (alpha at 72= .50; alpha at 87=.57) and ranges from 0 to 12. Higher scores indicate greater risk related to sexual activity.

⁵The Needle Frequency Scale is a proportional measurement of the frequency and recency of needle use (including sharing needles). Higher scores indicate more frequent and more recent needle use.

⁶The Substance Problem Scale is composed of 16 items (alpha's at baseline, 72, and 87 = .92) and ranges from 0 to 16. The items are not drug specific. Higher scores indicate more drug problems.

⁷The Depressive Symptom Scale is composed of 6 items at baseline ($\alpha = .74$) and 9 items at 72 and 87 months (α at 72 = .84; α at 87 = .85). The scale ranges from 0 to 6 at baseline and from 0 to 9 at 72 and 87 months. Raw scores are reported. Higher scores indicate more depressive symptoms.

Table 2

Substance Problems: Multivariate Cross-sectional and Longitudinal Associations

Measure	<u>Cross-Sectional</u>		<u>Longitudinal</u>	
	e ^b	SD	e ^b	SD
BINARY				
“Very likely to live to 35”	0.64	0.81	1.14	0.46
“Possible/very likely to get HIV”	0.22 *	0.63	0.26	0.65
Substance Problem Scale (72 Months)	---	---	0.63 *	0.16
Depressive Symptom Scale	0.92	0.82	1.21 *	1.63
Physical Health	0.63 *	0.58	1.34	1.41
Age of First Sexual Experience	0.95	0.88	0.87	0.72
Needle Frequency Scale	0.61	0.82	2.37	1.49
Age	0.88	0.81	1.01	1.02
Wave (Ref=72 months)	1.61	1.27	---	---
Female	2.97 *	1.51	2.44	1.40
Ethnicity (Ref=Hispanic)				
Black	0.82	0.93	0.95	0.98
White	0.75	0.90	0.10 *	0.45
Other	1.31	1.10	1.10	1.03
COUNT				
“Very likely to live to 35”	0.98	0.99	0.92	0.96
“Possible/very likely to get HIV”	1.62 **	1.16	1.29	1.09
Substance Problems at 72 months	---	---	1.00	1.01
Depressive Symptom Scale	1.18 ***	1.53	1.08	1.22
Physical Health	1.02	1.03	1.11	1.13
Age of First Sexual Experience	0.98	0.95	1.06	1.15
Needle Frequency Scale	1.16	1.06	1.17	1.07
Age	0.92	0.88	1.08	1.10
Wave (Ref=72 months)	1.34 *	1.16	---	---
Female	0.97	0.99	0.81	0.92
Ethnicity (Ref=Hispanic)				
Black	0.87	0.95	0.82	0.93
White	1.09	1.03	0.96	0.98
Other	1.15	1.05	1.27	1.09

Note: All longitudinal predictors are the 72-month values for these measures.

SD = Standard Deviation

Cross-sectional: N = 497; Longitudinal: N = 247

*
p < .05**
p < .01

p < .0001

Table 3

Sexual Risk: Multivariate Cross-sectional and Longitudinal Associations

Measure	Cross-Sectional		Longitudinal	
	OR/IRR	SE	OR/IRR	SE
LOGISTIC (Sexually Active in Previous 3 Months)				
“Very likely to live to 35”	1.40	0.33	1.06	0.35
“Possible/very likely to get HIV”	1.90	0.76	4.16 [*]	2.44
Sexually Active in Previous 3 Months	---	---	35.36 ^{***}	21.85
Recent Sexually Active [*] Sexual Risk	---	---	0.67 ^{**}	0.10
Depressive Symptom Scale	0.99	0.05	0.96	0.06
Physical Health	0.97	0.11	0.84	0.12
Age of First Sexual Experience	1.03	0.06	1.02	0.06
Needle Frequency Scale	0.74	0.20	1.08	0.38
Age	0.97	0.08	1.07	0.10
Wave (Ref=72 months)	0.84	0.18	---	---
Female	1.93	0.70	0.98	0.44
Ethnicity (Ref=Hispanic)				
Black	0.98	0.32	0.96	0.43
White	1.72	0.68	0.86	0.40
Other	1.32	0.50	0.91	0.41
POISSON (Sexual Risk Scale, 87 Months)				
“Very likely to live to 35”	0.99	0.05	0.90	0.09
“Possible/very likely to get HIV”	1.41 ^{***}	0.08	1.18	0.17
Sexually Active in Previous 3 Months	---	---	0.53 ^{**}	0.12
Recent Sexually Active [*] Sexual Risk	---	---	1.10	0.06
Depressive Symptom Scale	1.06 ^{***}	0.01	1.03	0.02
Physical Health	0.98	0.02	0.94	0.04
Age of First Sexual Experience	0.96	0.01	0.95 ^{**}	0.02
Needle Frequency Scale	1.09	0.07	1.02	0.11
Age	1.01	0.01	1.03	0.03
Wave (Ref=72 months)	1.00	0.04	---	---
Female	0.85 ^{**}	0.04	0.89	0.12
Ethnicity (Ref=Hispanic)				
Black	1.02	0.06	0.94	0.13
White	0.98	0.06	1.17	0.16
Other	0.99	0.06	1.19	0.16

Note: All longitudinal predictors are the 72-month values for these measures.

Cross-sectional: Logistic: N = 504, Poisson: N = 377; Longitudinal: Logistic: N = 252, Poisson: N = 159

OR = Odds Ratio; IRR = Incident Rate Ratio

^{*}
p < .05

**
p < .01

p < .0001