Life Experiences of Instability and Sexual Risk Behaviors Among High-Risk Adolescent Females

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Abstract

CONTEXT—Understanding the interplay of multiple contexts of adolescents' sexual risk behaviors is essential to helping them avoid pregnancy and STDs. Although a body of research has identified multiple individual- and family-level variables associated with adolescents' sexual risk behaviors, relatively few studies have examined relationships between these behaviors and latent indicators of unstable, chaotic environments.

METHODS—In 2007–2008, a sample of 241 sexually active adolescent females who were at high risk for pregnancy and STDs were recruited through two school-based clinics and two community clinics in Minneapolis and St. Paul. Confirmatory factor analysis was used with baseline data to specify latent constructs of individual risk and family disengagement. Structural equation models examined longitudinal relationships between baseline measures of these constructs and sexual risk behaviors assessed six months later.

RESULTS—The latent construct of individual risk encompassed substance use, violence perpetration, violence victimization and having witnessed violence; that of family disengagement included family disconnection, poor family communication and perceived lack of safety at home. Baseline level of individual risk was positively associated with number of male sex partners six months later (path coefficient, 0.2); it was not associated with consistent condom use at follow-up. Level of family disengagement was negatively associated with condom use consistency six months later (–0.3), but was not associated with number of male sex partners.

CONCLUSIONS—To meet the health needs of vulnerable adolescents, health systems should incorporate coordinated and interdisciplinary services that acknowledge adolescents' relevant familial and social contexts.

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Pregnancy and STDs pose substantial threats to the health of adolescents. Despite nearly two decades of decline, current adolescent pregnancy rates in the United States are among the highest in the industrialized world,[1] and approximately one-third of U.S. females become pregnant before age 20.[2] While accounting for only one-quarter of the country's sexually experienced population, young people aged 15–24 acquire almost half of all new STDs each year;[3] 38% of sexually experienced 14–19-year-old females who completed STD screening in a 2003 nationwide study had at least one STD.[4] High pregnancy and STD rates reflect patterns of sexual risk behavior among U.S. adolescents. In a 2007 national survey, 48% of all students in grades 9–12 reported having had sexual intercourse; among students who were currently sexually active, 35% had had four or more partners, and 39% had not used a condom at last intercourse.[5] Clearly, risky sexual behaviors and resulting sexual health outcomes among adolescents pose major public health and health services concerns.

Current efforts to reduce pregnancy and STD rates among adolescents focus on reducing sexual risk behaviors, such as having multiple sex partners and not using condoms consistently. To date, research has identified a number of individual and social contextual variables that are associated with these behaviors. Effectively addressing these variables may, in turn, contribute to decreases in rates of adolescent pregnancy and STDs.[6]

A number of individual-level experiences have been found to be associated with adolescents' sexual risk behaviors, including substance use and violence involvement.[6] On a social contextual level, families play a major role in young people's lives.[6] An array of family characteristics have been associated with risky sexual behaviors, including weak parent-child attachment, poor family communication, lack of physical and psychological safety at home, and exposure to family violence.[7] A 2007 systematic review of the literature suggested that contextual risk characteristics may be differentially associated with specific sexual risk behaviors.[6]

The experience of living in unpredictable or chaotic social environments—for example, situations marked by family stress resulting from family violence, drug use or physical abuse during childhood—may be directly related to sexual risk behaviors in adolescence.[8] Similarly, young women who experience chaotic and uncertain environments are more likely to have earlier first births and higher fertility rates than women who experience less stressful environments during their youth.[9,10] Qualitative research suggests that the experience of living in contexts of chaos and unpredictability may shape adolescents' sexual behaviors.[11,12] When asked to reflect on their childhood and adolescence, young mothers have described their futures as uncertain and unpredictable, but their sexual behavior and pregnancy risk as within their control.[11,12] Furthermore, general chaos in adolescents' daily lives may challenge their ability to consistently use contraceptives.[13]

Relatively few studies have examined relationships between sexual risk behaviors and latent measures of unstable, chaotic environments. An investigation that employs the social ecological model in examining the interplay between individuals and their environments has the potential to improve our understanding of associations between high-risk social contexts and sexual risk behaviors, pregnancy and STDs among adolescents.[14] In the present study, we used longitudinal data collected from sexually active adolescent females at high risk for

pregnancy and STDs to test the hypothesis that latent constructs reflecting individual risk and family disengagement are negatively associated with consistent condom use and positively associated with number of sexual partners over a six-month period.

METHODS

Study Design and Sample

Data were collected from a cohort of adolescents who participated in a randomized controlled trial of an intervention, Prime Time, targeting females at high risk for early pregnancy.[15] This clinic-linked intervention was designed using a youth development framework and employed a multifaceted approach, including one-on-one case management and mentored peer leadership groups over an 18-month period. Prime Time aims to address behaviors known to be associated with adolescent pregnancy, including sexual risk behaviors, violence involvement and school disconnection.[6,15]

Study recruitment was conducted from April 2007 to October 2008 through two school-based clinics and two community clinics in Minneapolis and St. Paul. Trained research staff invited sexually active 13–17-year-old females who, as assessed with a brief screening tool, met at least one of five risk criteria: A clinic visit that involved a negative pregnancy test or STD treatment; or self-reports indicating engagement in high-risk sexual and contraceptive behaviors (e.g., multiple sex partners or inconsistent contraceptive use), violent behaviors (e.g., recent history of physical fighting or weapon use) or behaviors indicating school disconnection (e.g., recent history of skipping school or being suspended).[16] Adolescents who did not understand consent forms, were married, were pregnant or had ever given birth were excluded. Of 1,270 females who completed the screening, 571 met eligibility criteria. Of these, 253 individuals agreed to participate—118 from community clinics (30% of those eligible) and 135 from school-based clinics (75% of those eligible). As a group, participants were similar to eligible nonparticipants with respect to age, race or ethnicity, receipt of public assistance, school enrollment and violence involvement, as well as number of sex partners and contraceptive use in the past six months. Participants were more likely than eligible nonparticipants to be living with one parent (64% vs. 52%; p<.05).[16] Written informed consent was obtained from all individuals, following the standard of practice for consent in each clinic.

After consent was obtained, participants provided baseline data via audio computer-assisted self-interview and were randomly assigned to the intervention or control group (126 and 127 adolescents, respectively). Six-month follow-up visits were scheduled with individual participants at times and public places convenient to them. The research staff person who scheduled the visit administered the survey, using audio computer-assisted self-interview. Ninety-one percent of the study sample completed the follow-up survey. Twelve individuals who reported having had no sex partners between the baseline and follow-up surveys were excluded, giving a final analytic sample of 241 participants. The institutional review boards of the University of Minnesota and participating clinics approved all study protocols.

Measures

Dependent variables—Consistent condom use was assessed at both the baseline and the six-month surveys, and was based on participants' responses to the question "How often in the past six months did you use a condom?" Response options were "never," "less than half the time," "half the time," "more than half the time" and "every time." Responses were subsequently dichotomized to reflect inconsistent or no use (half the time or less) versus consistent use (more than half the time).[17]

Number of sex partners was based on participants' answers to the open-ended question "In the last six months, how many males have you had sex with (his penis in your vagina)?" For each survey, responses were categorized as one, two, three, or four or more partners. The reliability of these dependent variables with clinic-based samples of adolescents has been detailed elsewhere.[18]

Independent variables—To examine adolescents' experiences of instability at baseline, latent constructs representing individual risk and family disengagement were modeled.

Individual risk encompassed four variables: violence perpetration, violence victimization, having witnessed violence and substance use. Violence perpetration was measured by a five-item scale (Cronbach's alpha, 0.71), adapted from a reliable measure in the National Longitudinal Study of Adolescent Health (Add Health),[19] that assessed how often in the last six months participants had threatened to hit or hurt someone, used or threatened to use a weapon, hit someone or beat someone up, been in a group fight or hurt someone badly enough that the person required health care. Response options of "never," "once or twice," "3–5 times," and "six or more times" were averaged across the five items; higher scores indicated greater violence perpetration.

A four-item scale (Cronbach's alpha, 0.71) assessed whether participants had been a victim of violence. They were asked how often in the past six months someone had threatened to hit or hurt them, used or threatened to use a weapon against them, hit them or beat them up, or hurt them badly enough that they required health care. The same responses as for violence perpetration were averaged across the four items, and higher scores indicated greater victimization.

The measure of having witnessed violence was adapted from the Urban Indian Youth Health Survey[20,21] and included two items (correlation coefficient, 0.35). Participants were asked how often they had seen someone beat up and how many times they had seen someone stabbed or shot; the questions specified that they referred to experiences "in real life (not on TV or the Internet)." Responses for each item were "never," "once or twice," or "three or more times." Participants were classified as having witnessed neither form of violence, one form or both forms.

A single item assessed substance use: "How often have you been drunk or high in the last six months?" Response options were "never," "less than once a month," "about once a month," "about once a week" and "daily."

The latent construct of family disengagement included three variables: family disconnection, poor family communication and perceived lack of safety at home. A five-item scale (Cronbach's alpha, 0.91), adapted from Add Health,[22] asked participants how close they were to others in their family (e.g., "My family understands me" and "I feel close to my family"). Responses of "not at all," "a little," "some" and "a lot" were reverse-coded and averaged across the five items; higher scores indicated greater disconnection from family.

A second five-item scale (Cronbach's alpha, 0.83), adapted from existing measures of general adolescent-family communication,[23,24] assessed the extent to which participants had discussed various topics with family members in the past six months (e.g., "In the last six months, how often have you and someone in your family talked about ways to resolve a conflict?"). Responses of "not at all," "a little," "some" and "a lot" were reverse-coded and averaged to create a single scale; higher scores represented poorer family communication.

A single item, adapted from the Urban Indian Youth Health Survey,[20,21] asked participants how often they felt safe in their home. Responses ("never or seldom," "sometimes," "often" and "very often") were reverse-coded, and higher scores indicated lower levels of perceived safety at home.

Exogenous variables—To account for baseline characteristics, models included age (as a continuous variable), race or ethnicity (black was the reference group), and a dichotomous measure for intervention or control group. In addition, a baseline measure of the dependent variable being modeled (consistent condom use or number of sex partners) was included in structural models.

Analysis

Structural equation modeling techniques, conducted in Mplus 5.2,[25] were used to estimate relationships between latent constructs of instability at baseline and sexual risk behaviors six months later. Initially, we examined Pearson correlations between all variables. Then, we estimated a measurement model specifying the latent variables (individual risk and family disengagement) using confirmatory factor analysis. As is typical in these models, one factor loading is fixed at 1.0 to determine the scale of the latent factor. Estimates of model fit and significance of individual indicator loadings on their respective latent variable were used to evaluate the quality of the measurement model; model fit was assessed using the mean- and variance-adjusted chi-square statistic, comparative fit index, Tucker-Lewis index and root mean square error of approximation index.

Next, structural paths between the latent constructs and the dependent variables were estimated in models. No significant intervention effects were found for six-month outcomes; therefore, intervention and control groups were pooled, and the full sample was used for structural equation modeling analyses. To generate parsimonious models and because of sample size limitations on the number of estimated parameters, separate models were estimated for consistent condom use and number of sex partners.

Our measures included dichotomous, categorical and ordinal variables. Flexible options in Mplus allow us to estimate models that include such nonnormally distributed measures

using weighted least squares with mean and variance adjustment.[25] To adjust for clustering within clinics (i.e., interdependence among females recruited from the same clinic), we used the Mplus *cluster* command with the *complex* method. This procedure provides adjusted standard errors and overall chi-square tests of model fit. Structural models also incorporated maximum likelihood missing data estimation. This strategy results in less-biased parameter estimates than traditional methods of dealing with missing data (e.g., listwise case deletion) and makes full use of available data from all participants in both study conditions who were sexually active at the six-month follow-up.[26]

RESULTS

Sample Characteristics

The study sample had a mean age of 15.6 years and was predominantly black (41%—Table 1). At baseline, 55% of participants said they had used condoms consistently in the past six months; overall, participants reported having had an average of 1.6 male sex partners over this period. Experience with violence, substance use and family disengagement was common. Forty-three percent of participants reported having hit someone or beat someone up in the previous six months, 28% had been hit or beat up in the same period, and 73% had ever witnessed someone being beat up, shot or stabbed. In addition, 60% of participants reported having gotten drunk or high in the past six months. Family disconnection and low levels of family communication were not uncommon. Nearly one-quarter of participants reported sometimes or always feeling unsafe at home. At the follow-up survey, half of the females said they had used condoms consistently over the past six months, and participants reported an average of 1.5 male sex partners during this time.

Correlation and Factor Analyses

None of the individual behavior measures was related to consistent condom use at six months (Table 2). In contrast, violence perpetration, substance use and violence victimization were positively related to the number of sex partners (correlation coefficients, 0.2–0.3). Two indicators of family disengagement—family disconnection and poor family communication—were negatively associated with consistent condom use at follow-up (–0.1 to –0.2). However, only family disconnection was related to the number of sex partners (0.1). The two measures of sexual risk behavior at follow-up were not significantly correlated.

The measurement model specifying the two latent constructs showed adequate fit to the data (Figure 1). The chi-square statistic was nonsignificant, but all of the other indices demonstrated good fit.[27] Loadings of the indicators of both individual risk and family disengagement were statistically significant and moderately large (average lambda, 0.68). The two latent variables were marginally positively related (correlation coefficient, 0.2), but the correlation was relatively small, suggesting that they were measuring distinct constructs.

Path Analysis

Predictably, baseline measures of consistent condom use and number of male sex partners were significantly related to these behaviors measured six months later (path coefficients,

1.04 and 0.4, respectively—Table 3). Number of sex partners at baseline was positively related to both latent constructs (0.2–0.3), even after controlling for age, race and intervention group. Small, positive relationships between age and family disengagement were found in both structural models (0.05–0.06); age was also positively associated with number of sex partners at six months (0.2). Being in the intervention group was inversely associated with individual risk in both structural models and with family disengagement in the condom use model (−0.3 to −0.4). Identifying oneself as being of either mixed race or other race, as opposed to black, was negatively associated with individual risk (−0.4 to −0.7), but positively related to family disengagement (0.3–0.7).

In the structural path model, after controlling for exogenous variables, baseline individual risk was not related to consistent condom use at six months (Figure 2). Family disengagement was negatively associated with consistent condom use (path coefficient, −0.3); that is, the higher the level of family disengagement adolescents reported at baseline, the lower their likelihood of reporting consistent condom use six months later. Overall, this model explained 24% of the variance in consistent use.

Individual risk at baseline was positively related to the number of partners six months later (path coefficient, 0.2). However, the relationship between family disengagement and number of sex partners was not significant after exogenous variables were controlled for. Overall, this model explained 21% of the variance in the number of sex partners reported at the six-month survey.

DISCUSSION

These results support a theoretical link between individual- and family-level constructs of instability and sexual risk behaviors among a high-risk sample of adolescent females. Sexual risk behaviors and violence involvement were more prevalent among this study sample at baseline than among national samples of sexually active adolescent females (e.g., 2007 Youth Risk Behavior Survey[5] and 2006–2008 National Survey of Family Growth[28]). Hence, findings from this study may be helpful in developing clinic services that adequately address the unique health services needs of a vulnerable population of youth.

Different aspects of instability were related to distinct sexual risk behaviors, lending partial support to our study hypotheses. Individual risk, characterized by involvement in violence and substance use, was positively associated with adolescents' reported number of male sex partners at the six-month follow-up. This finding supports the concept that adolescent risk behaviors cluster. Previous research documents the existence of a problem behavior syndrome—the occurrence together, in various combinations, of behaviors including violence and aggression, substance use and sexual risk-taking.[29] Because the latent construct of individual risk comprised behaviors indicative of a problem behavior syndrome,[30] adolescents who engaged in these risk behaviors at baseline likely had elevated odds of engaging in risky sexual behaviors over a six-month interval.

In contrast, we found no association between individual risk at baseline and condom use consistency six months later. However, level of family disengagement at baseline was

negatively associated with consistent condom use at follow-up. In other words, adolescents who reported more secure family connections, regular communication with their families and feelings of safety at home had an increased likelihood of reporting consistent condom use six months later. Connection and communication with family, both of which are well-established protective characteristics,[29] were associated with an increased probability of reporting protective sexual behaviors. Perhaps family contexts in which adolescents feel safe and experience secure attachments and ongoing communication foster development of social and emotional skills that are applicable to other contexts, such as negotiating consistent condom use with sexual partners.[31] However, it is also possible that the development of these skills may foster feelings of safety and security within family contexts.

Notably, the study's two measures of sexual risk behavior at six months were not significantly correlated. This suggests that although inconsistent condom use and multiple sex partners may both contribute to negative health outcomes, such as STDs, these behaviors are distinct; thus, differing sets of risk factors may contribute to each.

Limitations and Strengths

This study has several limitations. First, the relatively small sample size limited the number of paths that we could examine and, perhaps, the statistical power to detect significant relationships. Second, the analysis tested only one theoretical model, and other models may fit the data and explain variance in the outcomes equally well. Finally, our measure of number of sex partners asked only about male partners with whom participants had had vaginal intercourse, and so may have excluded partners with whom participants had engaged only in other sexual risk behaviors, such as oral sex.

However, the study also has several strengths. First, use of data from two time points allowed us to assess the temporal nature of relationships between experiences of instability and sexual risk behaviors. Second, because we controlled for demographic and baseline covariates, the significant findings represent robust statistical relationships. Finally, since the demographic and behavioral characteristics of study participants mirrored those of nonparticipants, our findings may be generalizable to a broader population of high-risk sexually active adolescent females seeking clinic services.

Conclusions

Among the multiplicity of potential influences on the sexual behavior of high-risk adolescent females,[29] instabilities during the adolescent years at both individual and family levels have direct, but distinct, links to inconsistent condom use and multiple sex partners. Understanding the relationships between individual- and family-level variables and adolescent sexual risk behaviors has important implications for research. Our results suggest that consistent condom use among adolescents may be more related to protective social influences than to individual risk behaviors. Hence, future research investigating condom use should consider the role of a wider circle of social contextual characteristics. In particular, our findings suggest continued value in further exploring the influences of family in cultivating protective sexual behaviors, including condom use, among females as well as males.

Our findings also have implications for the provision of adolescent health services. The Institute of Medicine report *Adolescent Health Services: Missing Opportunities* concludes that to fundamentally improve U.S. health systems for adolescents, we must incorporate prevention and health promotion services.[32] The present study, with a highly vulnerable group of adolescent females using health services, supports a multifaceted approach to preventing sexual risk behaviors and promoting sexual health. Given that instabilities during the adolescent years may influence distinct sexual risk behaviors, adolescent health services must include assessment of instability at both individual and family levels. Regarding the prevention of risky behaviors, interventions that account for the interconnectedness of adolescent problem behaviors are more likely to be effective than efforts that consider risk behaviors as isolated problems with separate solutions.[33] In terms of health promotion, interventions that foster family connectedness, regular communication among family members, and physical and psychological safety at home may support consistent condom use and other healthy behaviors among adolescent females.

Clinicians who see adolescents for sexual and reproductive health services are well placed to assess their levels of risk, offer health-promoting interventions and refer them to a wider network of services. By taking into account the contexts in which adolescents live, and providing care through a linked network of coordinated and interdisciplinary services, health systems serving adolescents can best address the complex health needs of vulnerable youth.

Acknowledgments

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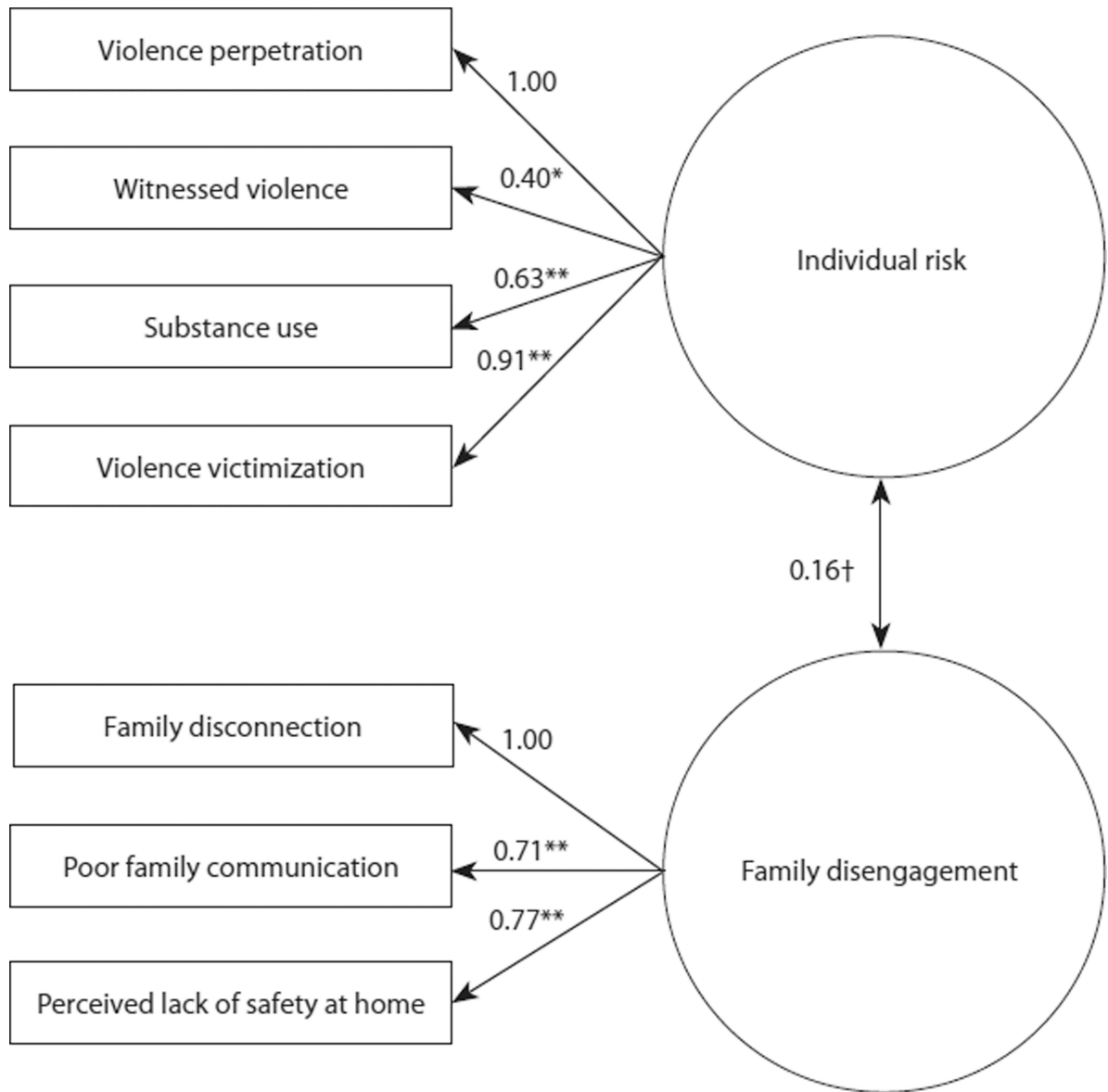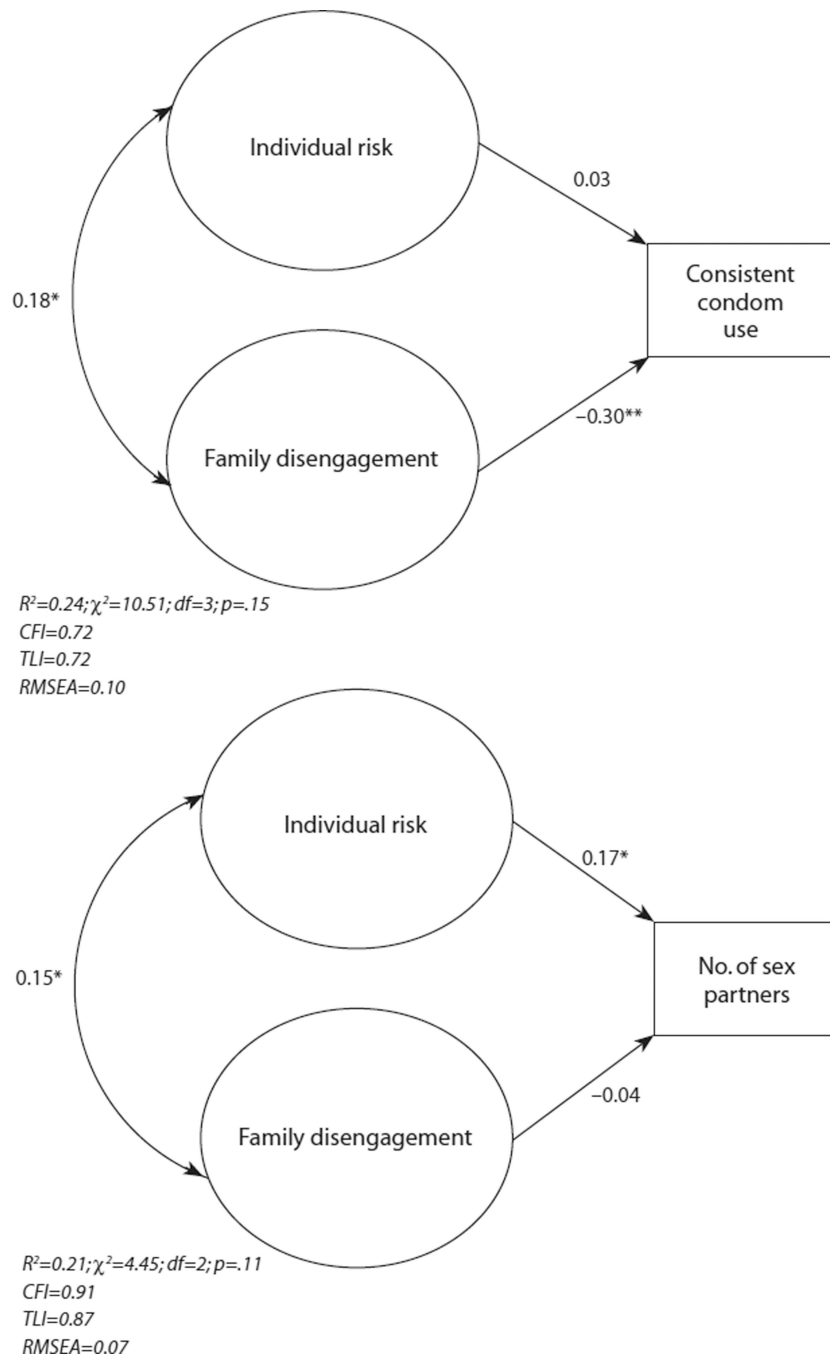
FIGURE 1.
Coefficients from factor analyses assessing components of individual risk and family disengagement
*p<.05. **p<.01. †p<.10. *Notes:* CFI=comparative fit index. TLI=Tucker-Lewis index. RMSEA=root mean square error of approximation.

R²=0.24; χ²=10.51; df=3; p=.15
CFI=0.72
TLI=0.72
RMSEA=0.10

R²=0.21; χ²=4.45; df=2; p=.11
CFI=0.91
TLI=0.87
RMSEA=0.07

FIGURE 2.
Coefficients from structural models assessing associations between instability constructs and sexual risk behavior
*p<.05. **p<.01. *Notes:* Models control for age, intervention group, race and ethnicity, and number of sex partners at baseline. (For coefficients for controls, see Table 3.)
CFI=comparative fit index. TLI=Tucker-Lewis index. RMSEA=root mean square error of approximation.

TABLE 1

Selected characteristics of participants in an intervention targeting adolescents at risk for early pregnancy, by timing of assessment, Minneapolis and St. Paul, 2007–2008

Characteristic	Mean or % (N=241)
Baseline	
Mean age (range, 13–17)	15.6 (1.11)
Race/ethnicity	
Black	41
Hispanic	12
Asian/Pacific Islander	12
White	11
American Indian	3
Mixed/multiple	21
Used condoms consistently in past 6 mos.	55
Mean no. of male sex partners in past 6 mos. (range, 1–12)	1.64 (1.25)
Hit someone or beat someone up in past 6 mos.	43
Been hit or beat up in past 6 mos.	28
Witnessed violence	
Never seen a beating/shooting/stabbing	27
Ever seen a beating or a shooting/stabbing	34
Ever seen a beating and a shooting/stabbing	39
Got drunk/high in past 6 mos.	60
Mean family disconnection score (range, 0–3)	1.11 (0.87)
Mean family communication score (range, 0–3)	1.25 (0.85)
Sometimes/always feels unsafe at home	22
Six-month follow-up	
Used condoms consistently in past 6 mos.	49
Mean no. of male sex partners in past 6 mos. (range, 1–7)	1.53 (1.02)

Notes: Unless otherwise noted, data are percentages. Figures in parentheses are standard deviations. For family disconnection, a higher score indicates greater disconnection; for family communication, a higher score indicates lower communication.

TABLE 2

Coefficients from analyses assessing pairwise correlations between study variables

Variable	Violence perpetration	Substance use	Violence victimization	Witnessed violence	Family disconnection	Poor family communication	Perceived lack of safety at home	Consistent condom use at 6 mos.	No. of sex partners at 6 mos.
Violence perpetration	1.00								
Substance use	0.27**	1.00							
Violence victimization	0.55**	0.20**	1.00						
Witnessed violence	0.35	0.17**	0.23**	1.00					
Family disconnection	0.16*	0.16*	0.21**	0.04	1.00				
Poor family communication	0.05	0.09	0.04	−0.04	0.70**	1.00			
Perceived lack of safety at home	0.05	0.05	0.15*	0.01	0.55**	0.42**	1.00		
Consistent condom use at 6 mos.	0.06	−0.02	0.00	−0.05	−0.14**	−0.15**	−0.08	1.00	
No. of sex partners at 6 mos.	0.16*	0.25**	0.17*	0.04	0.14*	0.09	0.05	−0.03	1.00

*
p<.05.

**
p<.01.

TABLE 3

Coefficients assessing associations of exogenous variables with latent constructs and dependent variables in structural models examining sexual risk behavior

Exogenous variable	Consistent condom use model			No. of sex partners model		
	Individual risk	Family disengagement	Dependent variable	Individual risk	Family disengagement	Dependent variable
Consistent condom use at baseline	−0.25	−0.01	1.04**	na	na	na
No. of sex partners at baseline	na	na	na	0.25**	0.22**	0.40*
Age	−0.03	0.05**	−0.03	−0.07	0.06**	0.15*
Intervention group	−0.36*	−0.36*	0.07	−0.33**	−0.11	0.07
Mixed race	−0.43**	0.28**	0.23	−0.36**	0.30**	0.39
Other race	−0.74**	0.57**	0.06	−0.66**	0.66**	0.18

*
p<.05.

**
p<.01.

Notes: The reference group for racial and ethnic comparisons was blacks. na=not applicable.