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HIV/STI Prevention Messaging: Targeting Root Causes of Sexual Risk Behavior

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Abstract

Introduction—Sexual risk behaviors (SRB) often lead to sexually transmitted infections (STI), yet little is known about what drives SRB and whether this differs by gender.

Method—Participants (n=920; 75% Caucasian) were drawn from the Raising Healthy Children study, enrolled in 1993 and 1994 in grades 1-2 and followed through age 24/25. Lifetime STI diagnosis was defined by self-report or seropositivity for *Chlamydia trachomatis* or herpes simplex virus 2. Multivariable models assessed individual (social skills, behavioral disinhibition) and environmental factors (family involvement, school bonding, antisocial friends) predictive of STI diagnosis as mediated by 3 proximal SRB (sex under the influence of drugs or alcohol, condom use, lifetime number of sex partners).

Results—Twenty-five percent of participants had ever had an STI. All SRB differed by gender ($p < 0.001$), and females were more likely to have had an STI ($p < 0.001$). Behavioral disinhibition and antisocial friends in adolescence were associated with more SRB for both genders, whereas social skills were associated with less SRB in females, but more in males. Considering SRB, individual, and environmental factors together, lifetime number of sex partners (ARR=1.04_{per partner}; 95%CI 1.03-1.05) and inconsistent condom use (ARR=1.10_{per year}; 95%CI 1.04-1.16) were associated with increased risk of STI whereas social skills was associated with decreased risk of STI (ARR=0.84; 0.75-0.93). Behavioral disinhibition appeared to drive SRB, but family involvement mitigated this in several cases.

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Conclusion—Adolescent environmental influences and individual characteristics drive some SRB and may be more effective targets for STI/HIV prevention interventions than proximal risk behaviors.

Graphical abstract

Summary

Longitudinal data demonstrated that potentially modifiable adolescent environmental and individual characteristics may drive sexual risk behavior and risk for sexually transmitted infections.

Keywords

sexually transmitted disease; STD; intervention; prevention; behavior; substance abuse

INTRODUCTION

Sexual risk behaviors (SRB) are linked to unintended pregnancy and sexually transmitted infections (STI), each of which is accompanied by substantial health, social and economic costs. Women afflicted with STI can suffer impaired reproductive health and are at risk for pelvic inflammatory disease, infertility, and ectopic pregnancy;¹ total direct medical costs for STI are estimated at \$15 billion.² Unintended pregnancies account for nearly half of all pregnancies in the United States (U.S.),³ have been associated with less antenatal care, less breastfeeding, and unsafe abortion;⁴ medical costs are estimated at over \$4 billion annually.⁵ Given these high costs, effective interventions to reduce SRB are a priority.

SRB have typically been defined as having sex under the influence of alcohol or drugs, multiple sexual partners, and unprotected sex, and are routinely assessed in the Youth Risk Behavior Survey⁶. Interventions targeting these behaviors are numerous and have achieved varying degrees of success^{7,8}. Most focus on high-risk populations and aim to reduce the occurrence of sex under the influence of alcohol or drugs, reduce the number of sex partners, or increase condom use, behaviors proximal to the time of infection. Many such interventions are gender specific, driven by the notion that sexual health strategies may differ for men and women⁹.

Despite the emphasis on SRB, the behaviors themselves have not always been linked to reduced risk for STI^{10,11} and when effects are observed they often wane over time.¹² One explanation for the modest efficacy of existing interventions may be insufficient intensity. Alternatively, intervention efficacy may differ by gender and/or individual traits. Finally, these proximal risk behaviors themselves may be the wrong target. SRB likely do not exist in isolation and may be driven by earlier life factors, individual differences, and an individual's environment during childhood and adolescence. Indeed, results from broad social developmental interventions that target earlier life influences have demonstrated reductions in risk behaviors in general, specific SRB, and STI.^{13,14}

To explore the relationships between early life individual and environmental factors, SRB, and STI, we conducted analyses of a longitudinal study of social development. We

hypothesized that earlier life individual and environmental factors would predict SRB (and their interaction), and that this, in turn, would predict STI. We also hypothesized that early life individual and environmental factors would independently predict STI. Moreover, given the significant gender differences in STI rates,¹⁵ we explored whether these relationships varied by gender.

METHODS

Study Population

The Raising Healthy Children (RHC) project, a longitudinal study of youth development, enrolled children in first and second grades in 1993 and 1994 in a suburban school district near Seattle. Participants from these two age cohorts (1 year apart) were interviewed annually each spring until 2011 (ages 24/25). A second interview was added in the fall of 2004, 2005, and 2006 when participants were transitioning out of high school. The study included a randomized controlled trial of an intervention targeting substance use and other problem behaviors during elementary, middle, and high school years.¹⁶ All research was approved by the University of Washington Human Subjects Review Committee.

Conceptual Model and Measures

Analyses were guided by our conceptual model (Figure 1). All measures were assessed prospectively through self-report unless otherwise indicated. For each measure, items were averaged at each age prior to combining across waves of data. Detailed information on the measures is available in Supplementary Table 1.

Sexually transmitted infection (STI)—At each of 8 assessments starting at age 18, participants were asked if they had ever been told by a doctor or nurse that they had an STI (HIV/AIDS, gonorrhea, syphilis, chlamydia, genital warts, genital herpes, or other STI). A serum specimen was collected from a subset of participants (N = 689) when they were age 24/25 and tested for antibodies to herpes simplex virus 2 (HSV-2) using HerpeSelect 2 (Focus Diagnostics, Cypress, CA) and *Chlamydia trachomatis* using a microimmunofluorescence assay.¹⁷ STI diagnosis spans ages 18.5-24 for the younger cohort and 19.5-25 for the older cohort and was defined as ever having reported an STI diagnosis or seropositivity for either HSV-2 or *C. trachomatis*.

Sexual risk behaviors (SRB)—*Sex under the influence* was measured 7 times between ages 18.5/19.5 and 24/25, and defined as drinking before having sex half of the time or more and/or ever using drugs before having sex in the past year. Each year a person engaged in sex under the influence was summed for a risk score. *Inconsistent condom use* during vaginal and anal sex was measured 7 times between 18.5/19.5 and 24/25, and defined as using condoms less than “always” in each year. Each year of inconsistent condom use was summed for a risk score. *Lifetime number of sexual partners* (ages 22-25) was assessed retrospectively at 3 timepoints (maximum number used in analyses). Because of the high range of reported numbers, the count was capped at 30 (95th percentile).

Individual characteristics—*Behavioral disinhibition* was measured at age 14-16 using a 5-item scale that assessed impulsivity and sensation seeking. Examples include “How often do you do what feels good, regardless of the consequences?” and “How often do you do something dangerous because someone dared you to do it?” Items were scored from 1-6 (1=never to 6=once a week or more), and summed, then standardized. *Social skills* were measured at ages 16-17 using a 7-item scale. Example items include “I am the kind of person who can cooperate with peers in groups” and “I am the kind of person who can make friends easily with my peers.” Items were scored from 1-4 (1=NO!; 2=no; 3=yes; 4=YES!) and summed, then standardized.

Environmental factors—All environmental factors were measured at 4 timepoints (ages 11-14) using a four-point scale (1=NO!; 2=no; 3=yes; 4=YES!). Sum scores were standardized. *Family involvement*. A 4-item scale assessed positive activities that parents and children did together (e.g., going to the library), and whether participants shared school progress with their parents. Having *antisocial peers* was measured as having close friends who skipped school, got into fights, or got in trouble with the teacher). A *school bonding* 5-item scale reflected the degree to which participants liked their teachers and classes and wanted to do well in school.

Demographic controls—*Childhood socioeconomic status (SES)* was measured as school report of eligibility for the National School Breakfast/Lunch program from ages 6-13 (qualification in any year was classified as lower SES). Gender and ethnicity (White/non-white) were self-reported.

Statistical Analyses

In bivariate analyses, we compared characteristics of participants with and without STI using Poisson regression with robust standard errors^{18,19} to generate risk ratios (RR) and 95% confidence intervals (CI). We assessed the relationship between individual and environmental characteristics (and their interaction) and SRB (sex while under the influence, inconsistent condom use) and STI using multivariable Poisson regression with robust standard errors and adjusting for race/ethnicity, SES, cohort, and participation in the intervention. Linear regression was used for analyses of lifetime sexual partners. Interactions were tested in the full sample and models were also stratified by gender. To evaluate whether individual and environmental characteristics drive SRB, we tested mediation using the Baron and Kenny approach,²⁰ first assessing the independent relationship of SRB with STI, next assessing the independent relationship of individual and environmental factors with STI, and finally assessing all relationships together. All models were estimated in Mplus 7 using the full information maximum likelihood method to account for missing data.²¹

RESULTS

Study Population

Of the original 1040 RHC participants, 89% completed follow-up through age 24/25; 920 had data on STI and are included in these analyses. Of these 920, 195 (21.2%) had ever been told by a health care provider they had an STI. Seventy-four of the 689 (10.7%) who

provided a serum sample were seropositive for *C. trachomatis* and/or HSV-2. A total of 232 (25.2%) had ever had an STI (either self-reported diagnosis or seropositivity).

Nearly half of the 920 participants (47%) were female; most were Caucasian (76%), with 3% African American, 6% Asian, 3% Native American, and 12% mixed race. Over a third (39%) met eligibility for free or reduced-price lunch between first and fifth grades, 454 (48%) were in the older cohort, and 491 (53%) had attended schools randomized to the intervention. The mean lifetime number of sex partners was 9.8 (range 0-30) and half (51%) reported no sex under the influence of drugs or alcohol at any time point. In contrast, 90% reported inconsistent condom use between ages 18-24/25.

Gender Differences

Females reported more inconsistent condom use than males ($\text{mean}_{\text{female}}=3.54$, $\text{mean}_{\text{male}}=2.69$, $p<0.001$). However, the gender difference in the number of sexual partners ($\text{mean}_{\text{female}}=9.21$, $\text{mean}_{\text{male}}=10.30$, $p=.06$) and sex under the influence ($\text{mean}_{\text{female}}=1.11$, $\text{mean}_{\text{male}}=0.128$, $p=.10$) was not statistically significant. During adolescence, females reported greater social skills ($z\text{-score}_{\text{female}}=0.10$, $z\text{-score}_{\text{male}}=-0.06$, $p<0.05$), more family involvement ($z\text{-score}_{\text{female}}=.09$, $z\text{-score}_{\text{male}}=-0.10$, $p<0.01$), and more school bonding ($z\text{-score}_{\text{female}}=.14$, $z\text{-score}_{\text{male}}=-0.12$, $p<0.001$) than males. In contrast, males endorsed more adolescent behavioral disinhibition items ($z\text{-score}_{\text{male}}=0.28$, $z\text{-score}_{\text{female}}=-.20$, $p<0.001$) and more antisocial peers ($z\text{-score}_{\text{male}}=0.29$, $z\text{-score}_{\text{female}}=-0.27$, $p<0.001$).

Bivariable Analyses: Characteristics Associated With STI

Males were significantly less likely than females to have had an STI, as were those of lower SES, but differences between Whites and other ethnicities were not significant (Table 1). In addition, individuals reporting more episodes of sex under the influence of alcohol or other drugs, inconsistent condom use, and more lifetime sex partners were more likely to have had an STI. Individuals with STI also had lower social skills, less positive family involvement, more antisocial peers, and somewhat higher levels of behavioral disinhibition. No differences in STI were detected by study cohort or intervention condition.

Multivariable Analyses: Early Life Individual and Environmental Predictors of SRB

In the full sample, there were 3 significant gender interactions: gender $\times$ antisocial peers ($p=0.03$) predicting inconsistent condom use; gender $\times$ social skills ($p=0.01$) predicting sex under the influence; and gender $\times$ social skills ($p=0.003$) predicting lifetime number of partners. Therefore, these models were developed separately by gender. In tests of interactions in the full sample, only the interaction between behavioral disinhibition and family involvement in the model predicting lifetime number of partners was significant ($p=.02$).

Sex under the influence—Having sex under the influence of alcohol or drugs was strongly predicted by behavioral disinhibition as well as by having antisocial peers, and this was consistent across gender (Table 2). Males with higher social skills reported more sex under the influence and women reported less; however, this relationship was only marginally

($p < .10$) significant for females and not significant for males, despite the significant gender interaction.

Inconsistent condom use—In gender-stratified analyses, males who reported more antisocial peers during adolescence were significantly more likely to have unprotected sex in young adulthood than females. However, the effect of antisocial peers on females' condom use appeared to be minimal. Although there was no statistically significant gender interaction for the relationship between family involvement and inconsistent condom use, family involvement in adolescence was associated with less inconsistent condom use among females but not among males in stratified analyses.

Lifetime number of sex partners—Males with high social skills had significantly more lifetime sex partners, whereas for women, the effect was in the reversed direction. Behavioral disinhibition and having antisocial peers predicted more partners for both males and females, but the effect of behavioral disinhibition was moderated by family involvement. For more disinhibited participants, greater family involvement was associated with fewer sex partners. For those who scored low on behavioral disinhibition, number of sex partners remained relatively flat regardless of family involvement.

Multivariable Analyses: Predictors of STI

There were no significant gender interactions with any predictor of STI in any of the models developed for the full sample ($p > 0.05$ for all), and all adjusted RRs in gender-stratified models were either both > 1.0 or both < 1.0 , suggesting no substantial differences in mechanisms of effect. Therefore, we prioritized results from the full sample models, but include gender-stratified models (Table 3).

When only SRB were assessed, number of sex partners, inconsistent condom use, and sex under the influence were all associated with increased risk for STI. When only individual and environmental factors were considered, social skills were associated with significantly reduced risk of STI, whereas antisocial peers and behavioral disinhibition increased risk. In the combined model with SRB and individual and environmental factors, number of sex partners and inconsistent condom use remained strongly associated with STI; higher social skills remained significantly associated with reduced risk of STI. Behavioral disinhibition was no longer associated with STI when SRB were included, suggesting a mediated effect of behavioral disinhibition on STI through SRB. Furthermore, there was a significant interaction between behavioral disinhibition and family involvement ($p = .03$). Higher behavioral disinhibition was associated with greater likelihood of STI when family involvement was low. However, when family involvement was high, risk of STI was no longer distinguished by levels of behavioral disinhibition.

DISCUSSION

In these longitudinal analyses, individual and environmental factors in childhood and adolescence were predictive of several SRB, but not always of STI. The relationships were complex and some differed by gender. Having antisocial peers and scoring high on behavioral disinhibition in adolescence were the most consistent predictors of SRB,

irrespective of gender. However, social skills in adolescence had different influences on SRB for males and females. Despite this, there were no significant gender differences for predictors of STI. SRB appeared to mediate the relationship between behavioral disinhibition and STI, and lifetime number of sex partners and inconsistent condom use remained independently associated with increased likelihood of STI after accounting for individual and environmental factors. In contrast, good social skills were associated with decreased risk for STI, and family involvement appeared to mitigate the impact of behavioral disinhibition.

The most consistent predictor of SRB was having antisocial peers in early adolescence. Both males and females who had antisocial peers in adolescence had more sex partners by young adulthood and were more likely to report sex under the influence. Several HIV/STI prevention interventions have effectively leveraged the powerful role of peers. Among men who have sex with men, condom use increased and number of sex partners decreased when influential peers endorsed safer sex behaviors.²² Similarly, the SISTA Project, led by peer educators, reduced sexual risk behavior among African American women in the 90 days following the intervention,²³ and demonstrated a significant decrease in chlamydial infections.²⁴ Efforts to support prosocial peer networks in young adolescence and engage youths in prevention programs at earlier ages may yield more sustainable low-risk behavioral patterns.

The relationship between social skills, SRB, and STI risk was somewhat paradoxical. Males with good social skills had more sex partners but females with good social skills had fewer partners, yet both males and females with good social skills were at reduced risk for STI. Social skills may give males an advantage in recruiting sex partners whereas females with good social skills may be better equipped to refuse sex, reducing exposure to STI. The importance of social skills in risk reduction for women may partly explain the effectiveness of the SISTA intervention which included social skills development.²³ For males, the lower risk of STI associated with high social skills despite higher numbers of partners may be partly due to the networks in which they are embedded. Better social skills may facilitate the introduction of young males into networks with low STI prevalence, and network prevalence is a key determinant of STI risk²⁵. The elevated STI risk for Blacks irrespective of individual risk behaviors²⁶ is likely due to higher STI prevalence in this sub-population and assortative mixing by race.

Behavioral disinhibition has been previously associated with early sexual debut,²⁷ another important risk factor for STI. Here, it was a strong predictor of sex under the influence, increased number of sex partners, and STI, and our mediation analyses suggest that behavioral disinhibition drives SRB. However, behavioral disinhibition was moderated by family involvement and this may be a particularly effective intervention target. High family involvement may reduce opportunities for sex (e.g., by enforcing curfew), provide adolescents with reasons for refusing sex (e.g., parents might find out), and may result in higher self-esteem and other positive rewards, making risk behaviors less attractive. Successful parenting skills interventions that enhance positive family involvement, such as those included in the RHC intervention,²⁸ may have far-reaching effects.

Young females have higher rates of STI than do young males,¹⁵ partly due to greater biologic susceptibility¹, partly to preferential partnering with older males who have higher STI rates²⁹, and partly to more comprehensive recommendations for STI screening in females that result in more females being tested.³⁰ Behavioral differences by gender have also been hypothesized to account for differential risk. Not surprisingly, we observed significant gender differences for all SRB and some of the individual and environmental antecedents to these behaviors. However, the consistency of the predictors of STI across gender suggests that despite differences in antecedent influences, intervention targets can be uniform for males and females.

Some study strengths and limitations should be noted. The sample size was large and loss to follow-up was low, minimizing the influence of non-response bias. Individual and environmental characteristics were all assessed in late childhood and early adolescence, establishing clear temporal sequence. Our analytic approach revealed general relationships between earlier life factors, SRB, and STI, but more in-depth analyses would be required to identify age-specific intervention points. Our combined measure of STI using self-report and serology captured individuals with previous STIs that would have been missed by either measure alone. In contrast, serology for *C. trachomatis* has somewhat low sensitivity,³¹ and we may have misclassified some individuals as chlamydia-negative. Finally, our study sample was primarily white and these findings should be tested for replication in other racial ethnic groups.

Developmental, individual, and environmental characteristics were strongly associated with SRB in these young adults, and may drive the risk behaviors typically targeted in prevention interventions. The impact of these SRB on risk for STI was clear and consistent across gender, despite differential influence of several precursors to the risk behaviors. Programs targeting more distal influences on SRB (such as behavioral disinhibition, social skills, and interaction with antisocial friends) may be more effective than those aimed at reducing the behaviors themselves.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

Acknowledgments

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Figure 1. Conceptual model of the relationships between STI, SRB, and earlier life individual and environmental factors.

Table 1

Characteristics associated with sexually transmitted infection (STI) in bivariate analyses

Predictors	STI Ever				Sig
	Yes * N=232	No * N=688	Total N = 920		
	N (%)			RR (95% CI)	
Demographics					
Male	71 (31)	415 (60)	486 (53)	0.39 (0.31, 0.50)	.000
White	168 (72)	531 (77)	699 (76)	0.83 (0.65, 1.06)	.136
Free lunch	112 (48)	249 (36)	361 (39)	1.44 (1.16, 1.80)	.001
Cohort (older)	107 (46)	336 (49)	443 (48)	0.92 (0.74, 1.51)	.474
Intervention (experimental)	110 (47)	378 (55)	488 (53)	0.80 (0.64, 1.00)	.047
	M (SD)			OR (95% CI)	Sig
STI Predictors					
Sex under the influence	1.64 (1.73)	1.04 (1.52)	1.20 (1.69)	1.16 (1.10, 1.22)	.000
Inconsistent condom use	3.72(1.84)	2.87 (2.00)	3.10 (1.98)	1.17 (1.11, 1.23)	.000
Lifetime number of sex partners [†]	13.50 (9.00)	8.51 (8.03)	9.79 (8.56)	1.04 (1.03, 1.05)	.000
Individual characteristics					
Social skills	−0.19 (0.98)	0.08 (0.99)	0.01 (1.00)	0.81 (0.72, 0.91)	.000
Behavioral disinhibition	0.16(1.00)	0.02(1.00)	0.06(1.00)	1.11 (0.99, 1.24)	.070
Environmental characteristics					
Family involvement	−0.16(1.03)	0.03(.98)	−0.01(1.00)	0.87 (0.77, 0.97)	.014
School bonding	−0.02(.99)	0.01(1.01)	0.00(1.00)	0.98 (0.87, 1.09)	.674
Antisocial peers	0.18 (1.11)	−0.02 (.96)	0.03 (1.00)	1.15(1.03, 1.28)	.012

* N (%) for categorical comparisons; mean for risk scores

[†] Number of lifetime sexual partners is capped at 30

Table 2

Predictors of STI risk factors (inconsistent condom use, having sex while under the influence, and lifetime number of sexual partners)[†]

Predictor	Sex under the influence N = 918		Inconsistent condom use [§] N = 917		Lifetime number of sex partners [‡] N = 919	
	Males ARR [†] (95% CI)	Females ARR [†] (95% CI)	Males ARR [†] (95% CI)	Females ARR [†] (95% CI)	Males Standardized β (95% CI)	Females Standardized β (95% CI)
Individual characteristics						
Social skills	1.07 (0.96, 1.21)	0.88⁺ (0.76, 1.02)	0.99 (0.92, 1.06)	1.03 (0.97, 1.09)	0.10[*] (0.01, 0.19)	-0.11[*] (-0.21, -0.01)
Behavioral disinhibition	1.24 ^{**} (1.10, 1.41)	1.34 ^{***} (1.17, 1.55)	1.04 (.97, 1.11)	1.07 [†] (1.00, 1.14)	0.14 ^{**} (0.04, 0.24)	0.21 ^{***} (0.10, 0.31)
Environmental characteristics						
Family involvement	0.97 (0.86, 1.09)	0.97 (0.84, 1.12)	0.98 (0.91, 1.06)	0.93 [*] (0.88, 0.99)	-0.02 (-0.12, 0.09)	0.04 (-0.07, 0.15)
School bonding	0.97 (0.87, 1.08)	0.90 (0.76, 1.07)	1.03 (0.96, 1.10)	0.97 (0.91, 1.04)	0.00 (-0.11, 0.10)	-0.02 (-0.13, 0.08)
Antisocial peers	1.19 ^{**} (1.06, 1.35)	1.20 [*] (1.04, 1.38)	1.09[*] (1.01, 1.17)	0.96 (0.90, 1.03)	0.16 ^{**} (0.06, 0.27)	0.15 ^{**} (0.04, 0.27)

Note. **BOLD** indicates a significant gender interaction

⁺ p < .10,

^{*} p < .05,

^{**} p < .01,

^{***} p < .001

[†] ARR = adjusted relative risk. All analyses adjusted for ethnicity, childhood SES, cohort, and intervention; models are adjusted for other individual and environmental characteristics displayed in the same column.

[§] RRs represent the change in risk for each year of inconsistent condom use.

[‡] Includes significant behavioral disinhibition × family involvement interaction ($\beta_{\text{male}} = .07 [-0.02, .17]$, p > .05; $\beta_{\text{female}} = .09 [-0.01, .18]$, p < .10).

Proximal and distal predictors of STI in multivariable models for the full sample and multivariable models stratified by gender[†]

Table 3

	Sexual Risk Behaviors N = 920			Individual / Environmental Factors N = 920			Combined Model [‡] N = 920		
	Full sample	Males	Females	Full sample	Males	Females	Full sample	Males	Females
	ARR [†] (95% CI)	ARR [†] (95% CI)	ARR [†] (95% CI)	ARR [†] (95% CI)	ARR [†] (95% CI)	ARR [†] (95% CI)	ARR [†] (95% CI)	ARR [†] (95% CI)	ARR [†] (95% CI)
Number of sex partners	1.04 ^{***} (1.03-1.05)	1.04 ^{**} (1.02-1.06)	1.04 ^{***} (1.03-1.05)	-	-	-	1.04 ^{***} (1.03-1.05)	1.04 ^{**} (1.01-1.06)	1.04 ^{***} (1.03-1.05)
Inconsistent condom use [§]	1.09 ^{**} (1.03-1.15)	1.14 [*] (1.03-1.27)	1.06 [†] (1.00-1.13)	-	-	-	1.10 ^{**} (1.04-1.16)	1.14 [*] (1.03-1.28)	1.07 [*] (1.00-1.14)
Sex under the influence	1.07 [*] (1.00-1.13)	1.10 (0.97-1.23)	1.05 (0.98-1.13)	-	-	-	1.04 (0.98-1.11)	1.07 (0.95-1.21)	1.03 (0.96-1.11)
Social skills	-	-	-	0.84 ^{**} (0.75-0.93)	0.73 ^{**} (0.60-0.89)	0.88 [*] (0.77-0.99)	0.84 ^{**} (0.75-0.93)	0.70 ^{***} (0.58-0.85)	0.90 [†] (0.79-1.01)
Behavioral disinhibition	-	-	-	1.13 ^{**} (1.01-1.27)	1.33 [*] (1.06-1.66)	1.07 (0.93-1.22)	1.03 (0.91-1.16)	1.19 (0.92-1.55)	0.97 (0.85-1.10)
Family involvement	-	-	-	0.95 (0.84-1.07)	0.92 (0.71-1.19)	0.96 (0.85-1.09)	0.98 (0.87-1.11)	0.95 (0.69-1.30)	0.97 (0.86-1.10)
School bonding	-	-	-	1.05 (0.93-1.19)	1.08 (0.87-1.34)	1.02 (0.88-1.18)	1.07 (0.95-1.20)	1.10 (0.90-1.36)	1.03 (0.90-1.18)
Antisocial peers	-	-	-	1.17 [*] (1.03-1.32)	1.21 (0.94-1.57)	1.18 [*] (1.03-1.35)	1.10 (0.97-1.25)	1.10 (0.84-1.44)	1.11 (0.97-1.27)

Note. **BOLD** indicates a significant gender interaction (none present)

[†]ARR = adjusted relative risk. Full sample adjusted for gender, ethnicity, childhood SES, cohort, and treatment condition, and other factors included in the same column. Males/Females adjusted for ethnicity, childhood SES, cohort, and treatment condition, and other factors included in the same column.

[§]ARRs represent the change in risk for each year of inconsistent condom use.

[‡]Includes significant behavioral disinhibition × family involvement interaction (ARRfull = .90 [.80, .99], p < .05; ARRfemale = .90 [.80, 1.01], p < .10; ARRmale = .90 [1.73, 1.12], p > .05).

[†]p < .10,

^{*}p < .05,

^{**}p < .01,

^{***}p < .001