

Developmental Pathways to Sexual Risk Behavior in High-Risk Adolescent Boys



WHAT'S KNOWN ON THIS SUBJECT: Investigations of adolescents' sexual risk behavior have focused on factors such as parental monitoring, deviant peer affiliation, and daring that occur during early and midadolescence. Less is known about early childhood precursors to adolescent sexual risk behavior.



WHAT THIS STUDY ADDS: This prospective longitudinal study identifies parenting practices and mothers' depressive symptomatology during early childhood as precursors to later sexual risk behavior and involvement in pregnancy in adolescent boys, with deviant peer affiliation during emerging adolescence mediating these relationships.

abstract



OBJECTIVE: Adolescent boys' involvement in pregnancy and sexual risk behavior is a public health concern. Although research has identified predictors of sexual risk behavior during adolescence, few studies have investigated precursors to boys' sexual risk behavior beginning in early childhood, the identification of which could serve to inform interventions and help reduce involvement in pregnancy. Our goal was to identify early developmental pathways associated with sexual risk behavior in a sample of low-income adolescent boys.

METHODS: Data from a prospective longitudinal study in 310 at-risk boys were used to examine externalizing problems, mothers' depressive symptoms, and low-nurturant parenting in early childhood (1.5, 2, and 3.5 years old) and daring, externalizing, parental monitoring, and deviant peer affiliation during emerging adolescence (11 and 12 years old) as precursors of sexual risk behavior between the ages 15 and 20 years. Structural equation modeling was used to explore pathways associated with later high-risk sexual behavior (HRSB).

RESULTS: In multivariate analyses, adolescent daring and deviant peer affiliation at age 12 were associated with later HRSB. Furthermore, deviant peer affiliation during emerging adolescence mediated the relationship between mothers' depressive symptoms and nurturant parenting during early childhood and later adolescent HRSB.

CONCLUSIONS: Family-based risk factors in early childhood are predictive of HRSB in adolescence but are also influenced, and in some cases mediated, by relationships with peers and child characteristics during emerging adolescence. *Pediatrics* 2014;133:1038–1045

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KEY WORDS

sexual risk behavior, adolescents, development, early childhood risk factors

ABBREVIATIONS

CBCL—Child Behavior Checklist
HRSB—high-risk sexual behavior
SES—socioeconomic status
SRD—Self-Report of Delinquency
TC—target child/children

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High-risk sexual behaviors (HRSBs), which include early initiation of intercourse (eg, age ≥ 15 years)¹ and lack of consistent and effective contraception usage during adolescence remain all too common in the United States.² Results from the National Survey of Family Growth indicate that only 66.5% of sexually active teenage males report consistently using a condom in the last month. Such HRSB in teenagers can have serious consequences, including sexually transmitted infections and unwanted pregnancies,² which result in tremendous costs to individuals and society.^{3,4} Despite public health concern surrounding adolescent HRSB and teen pregnancy, little is known about developmental pathways preceding adolescent HRSB.

Previous research has identified several risk factors for adolescent HRSB across child, family, peer, and socioeconomic domains during adolescence, including the following: sensation seeking,^{5–7} externalizing problems,^{8,9} low parental monitoring,^{10–12} deviant peer affiliation,^{13,14} and low socioeconomic status (SES).¹⁵ However, studies investigating HRSB often explore a limited number of risk factors despite well-established associations linking individual and contextual risk to HRSB.^{14,16} Results from studies that have examined multiple domains of risk in relation to 1 component of HRSB, timing of first sexual intercourse, suggest a dynamic interplay between individual, family, and peer factors during adolescence.^{17–19} However, it is unclear whether similar factors influence additional types of HRSB (eg, effective contraceptive use). Moreover, there is a lack of research that considers multiple domains of risk for HRSB from early childhood. Therefore, adopting a developmental cascade approach, which examines the longitudinal interplay between proximal and

distal influences on individual development over time,²⁰ could help to advance our understanding of risk for HRSB. Furthermore, young men are often neglected in research on teen pregnancy. Consequently, there is a need for longitudinal research in male adolescents linking risk factors from multiple domains to HRSB and involvement in teen pregnancy.

Little is known about long-term developmental pathways to adolescent HRSB because studies examining early childhood precursors are limited. A small body of work suggests that early child abuse,²¹ an extreme form of negative parenting, and early externalizing problems^{8,9} are associated with adolescent HRSBs. However, more longitudinal, prospective studies tracing developmental precursors of HRSB are needed to fully elucidate processes that could be targeted by intervention. Although compromised parenting and behavior problems during early childhood could be directly related to adolescent HRSB, a growing body of evidence suggests that cascading pathways provide a clearer picture of mechanisms linking early risk with adolescent behavior.^{17,19,20,22} These studies indicate that risk factors in early childhood (eg, harsh parenting, maternal depression, and child externalizing) can increase the likelihood of children's exposure to additional risk factors during adolescence (eg, affiliation with deviant peers and decreased parental monitoring) and subsequent high-risk behavior. Moreover, many children who experience early risk do not go on to exhibit HRSB; therefore, it is important to understand additional risk processes that occur during middle childhood and early adolescence, which could be targeted by intervention. It is noteworthy that previous work with the current sample investigating a related health-risk behavior,²³ adolescent sub-

stance use, identified cascading pathways first emerging during the toddler period, including both family and child risk factors, which, in turn, predicted deviant peer affiliation and low parental monitoring in early adolescence and substance use in later adolescence.²⁴ Given strong theoretical and empirical ties between child and family risk and deviant peer affiliation and parental monitoring,^{25,26} as well as between peers and monitoring during adolescence and later deviant behavior,^{27,28} it is possible that similar developmental pathways are relevant for adolescent HRSB.

Understanding pathways of risk for HRSB in low-socioeconomic populations is especially important given their heightened risk for engaging in HRSBs²¹ and experiencing associated consequences.²⁹ In addition, the magnitude of HRSB consequences (eg, teen pregnancy) is likely amplified in low-income populations because of a dearth of financial and community resources,³⁰ which places the next generation at risk for HRSB. By identifying early childhood predictors of adolescent HRSB in high-risk populations, it might be possible to reduce future HRSB and teen pregnancy by using preventive interventions in early childhood.³¹ The goal of this study was to examine whether cascading pathways similar to those found for adolescent substance use were evident for HRSB. Specifically, we investigated whether low levels of nurturant parenting and high levels of maternal depressive symptoms and externalizing problems during early childhood were associated with lower levels of maternal monitoring and higher deviant peer affiliation in early adolescence, and with HRSB in later adolescence. Furthermore, we hypothesized that adolescent daring, an established predictor of adolescent risk-taking behavior³² considered to be an aspect of one's

temperament,³³ would independently predict HRSB during later adolescence.

METHODS

Participants and Procedures

This study used data from the Pitt Mother and Child Project, an ongoing longitudinal study in boys from low-socioeconomic backgrounds. Participants were recruited from the Allegheny County Women, Infants, and Children Nutritional Supplement program in the Pittsburgh metropolitan area.¹⁶ A sample of 310 families with 1.5-year-old sons participated in the study (53% white, 36% African American, 11% of other or mixed races). At recruitment, the age of mothers ranged from 17 to 43 years old (mean = 27.82; SD = 5.33) and two-thirds had 12 years of education or fewer. The mean per capita income was \$241 per month, and the mean Hollingshead SES score was 24.5.

For the current study, target children (TC) and their parents were seen in the home and/or laboratory for 2- to 3-hour visits 11 times between the ages of 1.5 and 17 years. Additionally, at ages 16 and 18, brief phone interviews with the TC were conducted, and at age 20 a laboratory visit with only the TC was conducted. Retention rates ranged from 81% to 89% for all visits conducted in the home and/or laboratory. Retention rates at the age 16 and 18 phone interviews were 80% and 67%, respectively. Participants who had missing data at ages 15, 16, 17, 18, and 20 years did not differ from the rest of the sample in relation to SES, race, marital status, or maternal age. The institutional review board at the University of Pittsburgh reviewed and approved all procedures for the protection of human subjects.

Measures

Nurturant Parenting

Nurturant parenting at age 2 was derived from the Nurturance factor of

the Home Observation for Measurement of the Environment (HOME).³⁴ The HOME assesses the quality and quantity of support and stimulation in the child's home environment by using observations and parent interview. The Nurturance score was obtained by calculating separate sum scores for the Responsivity and Acceptance subscales, with higher scores reflecting more positive parenting. For the 11-item Responsivity scale ($\alpha = 0.71$), examiners rated parents' emotional and verbal responsivity to the child. Examiners assessed parents' acceptance of the child's behavior by using the 8-item Acceptance subscale ($\alpha = 0.67$).

Mothers' Depressive Symptomatology

Mothers completed the Beck Depression Inventory,³⁵ a widely used measure of depressive symptoms, when their sons were 1.5, 2, and 3.5 years ($\alpha = 0.83$, 0.83, and 0.87, respectively). Mothers rated the severity of 21 symptoms and characteristics of depression on a Likert scale ranging from 0 (no symptomatology) to 3 (severe symptomatology). Responses were summed, with higher scores reflecting more depressive symptoms with scores of ≥ 10 indicative of mild depressive symptomatology.

Externalizing Problems

Mothers completed the Child Behavior Checklist (CBCL) 2–3³⁶ during visits when their sons were 2 and 3.5 years ($\alpha = 0.90$ and 0.89, respectively) and the CBCL 4–16³⁷ when their sons were 11 and 12 years ($\alpha = 0.92$ and 0.93, respectively). The CBCL is a parent-report measure of child adjustment problems based on their child's behavior within the past 2 months using a Likert scale ranging from 0 (not true at all) to 2 (very true or often true). T-scores from the broadband externalizing factor were used. A cutoff point

of 70 has been recommended as clinically meaningful.³⁷

Adolescent Daring

Daring was assessed at age 12 by using parent and TC report of the 5-item Daring factor from the Child and Adolescent Disposition Scale,³⁸ which is akin to measures of sensation seeking. The Child and Adolescent Disposition Scale assesses preferences for novel stimulation and risk taking and has been found to be internally consistent and externally valid in multiple samples. Respondents rated items on how well the emotion or behavior describes the TC on a Likert scale ranging from 1 (not at all) to 4 (very much/very often). Mean scores were calculated for maternal and youth report separately ($\alpha = 0.74$ for parent, $\alpha = 0.63$ for TC), with higher scores reflecting higher levels of daring.

Parental Monitoring

At age 12, TC were interviewed about their parents' monitoring of their whereabouts²⁵ ($\alpha = 0.71$). Mean scores were calculated by using youth ratings of 5 items (eg, "How often does at least one of your parents know where you are after school?") on a Likert scale ranging from 1 (never or almost never) to 5 (always or almost always).

Deviant Peer Affiliation

At age 12, TC completed a modified version of the Self-Report of Delinquency (SRD).³⁹ This report included 14 questions regarding antisocial behaviors of their peers (eg, "Have your friends taken anything that did not belong to them?") ($\alpha = 0.83$). Sum scores were calculated by using participants' responses on a 3-point rating scale (0 = never, 1 = once/twice, 2 = more often).

Covariates

Families' SES at 1.5 years was calculated by using the mean Hollingshead⁴⁰

4-factor index score. The TC's "race" was dummy coded as European American or other. Additionally, "mother's education" and "mother's age when she first had a child" were also included as covariates.

HRSB

To evaluate youths' HRSB at ages 15, 16, 17, 18, and 20 years, 3 items from the SRD³⁹ were used. Youth indicated if, in the past year, they "had sex with another person," "had unsafe sex (i.e., sex without a condom)," and "gotten someone else pregnant?" by using a 3-point rating scale (0 = never, 1 = once/twice, 2 = more often). It is noteworthy that because the SRD was not designed specifically to assess HRSB, items dealing with HRSB were limited. Because participants were seen close to their birthday, responses at each year reflect behavior in the preceding year. Responses for "had sex with another person" were used for ages 15 and 16 only, because sexual activity is generally considered normative during late adolescence.¹ Responses for "gotten someone else pregnant" were dichotomized and weighted (0 = no, 2 = yes). A mean score was derived for each year, and then a total mean score was computed for overall HRSB ($\alpha = 0.72$).

Statistical Analyses

Mplus 5.2⁴¹ was used to conduct structural equation modeling. Before analyses, log transformations were conducted on variables that were non-normally distributed and missing data were determined to be missing at random as per recommendations by Acock⁴²; therefore, the full sample was used.

Before computing the full structural equation model, latent factors were constructed for mothers' depressive symptomatology, nurturant parenting, early childhood externalizing problems, emerging adolescent externaliz-

ing problems, and daring. For all variables for which only 2 indicators were available, the pair of indicators was treated as parallel such that each manifest variable was fixed to 1 to load equally onto the latent construct. The use of latent variables also served to rectify such instances in which the α for 1 of the indicator values was <0.7 (ie, daring and nurturant parenting). A maximum likelihood estimator was used to estimate the structural model. The model tested included direct pathways from all earlier constructs to later constructs and controlled for the previously discussed covariates. Additionally, concurrent measures were permitted to correlate within the model. Model fit statistics (Comparative Fit Index [CFI],⁴³ the Tucker Lewis Index [TLI],⁴⁴ and root mean square error of approximation [RSMEA]⁴⁵) were used to evaluate the fit of the model. Bootstrapping, a nonparametric procedure that involves repeatedly sampling the data set and estimating indirect effects,⁴⁶ was used to test for indirect effects.

RESULTS

Descriptive statistics for predictor variables are displayed in Table 1. Table 2 presents frequency of responses for the HRSB items in the past year. Analyses of lifetime behavior indicate that by the age of 18, 66% of participants were sexually active. By the age of 20, 20% of all participants had gotten someone pregnant and 58% had engaged in unsafe sex. Notably, of the boys who endorsed being sexually active at some point before age 20, 77% indicated that they had engaged in unsafe sex at least once. In univariate analyses, HRSB was inversely correlated with nurturant parenting ($r = -0.15, P < .01$) and European American status ($r = -0.17, P < .01$) and positively correlated with adolescent externalizing problems ($r = 0.22, P < .001$), daring ($r = 0.39, P < .01$), and deviant peer affiliation ($r = 0.35, P < .01$). All constructs measured during early childhood were significantly correlated with one another ($P < .001$) and, with the exception of parental monitoring and daring ($r = -0.04$, not

TABLE 1 Descriptive Statistics for Early Childhood and Early Adolescent Variables

Measure	N	Possible Range	Mean	SD	Sample Range
Mother's educational level, years of school completed	310	0–20+	12.57	1.50	8–18
Mother's age when she had her first child, years	310	—	21.49	4.33	13–40
SES, Hollingshead score	310	8–66	23.367	9.24	6–58
Early externalizing problems, t-scores					
2 years	287	0–100	54.67	8.83	28–88
3 years	279	0–100	62.93	13.35	28–100
Mother's depressive symptoms					
1.5 years	310	0–63	9.04	6.86	0–45
2 years	302	0–63	7.58	6.27	0–36
3.5 years	281	0–63	7.21	6.91	0–43
Nurturant parenting: 2 years					
Responsivity	289	0–11	8.52	2.10	1–11
Acceptance	289	0–8	4.97	1.93	0–8
Early adolescent externalizing problems, t-scores					
11 years	240	0–100	49.85	11.28	30–82
12 years	234	0–100	50.24	11.50	32–82
Daring: 12 years					
PC report	223	1–4	2.56	0.62	1–4
TC report	220	1–4	2.96	0.60	1.2–4
Deviant peer affiliation at age 12	235	0–42	3.45	3.81	0–23
Parental monitoring at age 12	232	1–5	4.13	0.74	1.4–5

—, Childbearing range includes pubertal onset through menopause. PC, primary caregiver.

TABLE 2 Frequencies of High-Risk Sexual Behavior

Age	N	In the past year, have you							
		Had sex with another person, n (%)			Had unsafe sex (ie, sex without a condom), n (%)			Gotten someone else pregnant, n (%)	
		0: Never	1: 1–2 Times	2: ≥3 Times	0: Never	1: 1–2 Times	2: ≥3 Times	0: No	2: Yes
15 years	256	195 (76)	33 (13)	28 (11)	235 (92)	18 (7)	3 (1)	256 (100)	0
16 years	247	166 (67)	34 (14)	49 (19)	227 (92)	12 (5)	8 (3)	247 (100)	0
17 years	248	114 (46)	48 (19)	86 (35)	185 (75)	44 (18)	19 (7)	235 (95)	13 (5)
18 years	204	84 (41)	45 (22)	75 (37)	163 (80)	21 (12)	17 (8)	197 (97)	7 (3)
20 years	248		— ^a		119 (48)	69 (28)	60 (24)	219 (88)	29 (12)

^a The item "Had sex with another person" was not administered at age 20.

significant), all constructs measured in emerging adolescence were correlated with one another ($P < .001$). Fit indices indicated that the final structural model (see Fig 1 and Table 3) provided an acceptable fit to the data (TLI = 0.934, CFI = 0.955, RMSEA = 0.0038). Bootstrapping analysis confirmed significant indirect effects from nurturant parenting ($\beta = -0.09$, $P < .05$) and mothers' depressive symptoms ($\beta = -0.06$, $P < .05$) on HRSB via deviant peer affiliation.

DISCUSSION

This study examined developmental pathways of HRSBs from early childhood through emerging adolescence

across child, family, and peer domains in a sample of high-risk boys. Multivariate analyses identified 2 maternal factors in early childhood, high levels of mother's depressive symptoms and low nurturant parenting, as risk factors for adolescent HRSB. However, for both of these early indicators, associations with later HRSB operated through early adolescent deviant peer affiliation, such that lower levels of positive parenting and higher levels of mother's depressive symptoms during early childhood were associated with increased rates of deviant peer affiliation in emerging adolescence, which, in turn, was associated with increased rates of HRSB during late adolescence.

As expected, in the multivariate analyses, daring during emerging adolescence was directly related to HRSB, but externalizing problems assessed during early childhood and emerging adolescence were not. The latter results are in contrast to previous work that has found externalizing problems in early childhood and adolescence to be linked with later HRSB.⁹ However, because the current study incorporated multiple risk factors from child, family, and peer domains, it is possible that externalizing problems represent a less proximal indicator of risk than other child factors such as daring or peer factors, such as having friends who engage in antisocial activities.

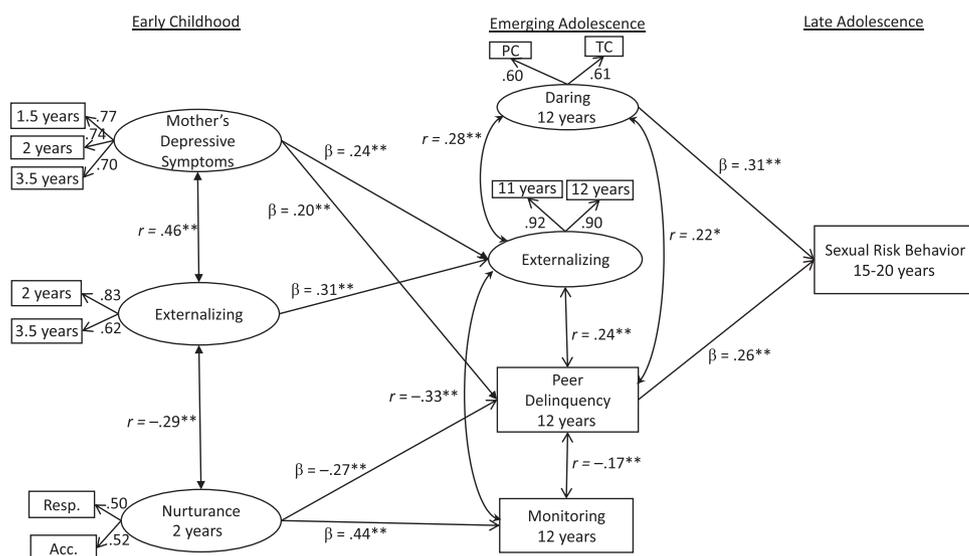


FIGURE 1

Developmental pathways from early childhood to HRSB in late adolescence; $N = 310$ (TLI = .934, CFI = .955, RMSEA = .0038). * $P < .05$, ** $P < .01$. Acc., Acceptance; CFI, Comparative Fit Index; PC, primary caregiver; Resp., Responsivity; RMSEA, root mean square error of approximation; TLI, Tucker Lewis Index.

TABLE 3 Path Coefficients and Covariates in the Final Structural Model

Path	β^a	<i>P</i>
Early externalizing → adolescent externalizing	0.31	.00
Early externalizing → parental monitoring	0.15	.15
Early externalizing → HRSB	-0.08	.43
Nurturant parenting → adolescent externalizing	-0.04	.66
Nurturant parenting → parental monitoring	0.44	.00
Nurturant parenting → deviant peer affiliation	-0.27	.00
Nurturant parenting → HRSB	-0.11	.31
Depressive symptoms → adolescent externalizing	0.24	.00
Depressive symptoms → parental monitoring	-0.10	.28
Depressive symptoms → deviant peer affiliation	0.20	.01
Depressive symptoms → HRSB	-0.03	.73
Adolescent externalizing → HRSB	0.10	.25
Daring → HRSB	0.31	.00
Deviant peer affiliation → HRSB	0.26	.00
Parental monitoring → HRSB	0.11	.17
	<i>r</i>	<i>P</i>
Correlations among residual covariances		
Early externalizing with depressive symptoms	0.46	.00
Early externalizing with nurturant parenting	-0.29	.01
Depressive symptoms with nurturant parenting	-0.19	.10
Daring with adolescent externalizing	0.28	.00
Daring with deviant peer affiliation	0.22	.04
Daring with parental monitoring	-0.04	.72
Adolescent externalizing with parental monitoring	-0.33	.00
Adolescent externalizing with deviant peer affiliation	0.24	.01
Parental monitoring with deviant peer affiliation	-0.17	.02

^a Standardized coefficient.

Despite our hypothesis, parental monitoring during emerging adolescence was not associated with HRSB in the univariate or multivariate analyses; however, monitoring was negatively linked with deviant peer affiliation and externalizing problems in the multivariate and univariate analyses. Although some studies have found that parental monitoring during later adolescence serves as a protective factor in relation to HRSB, the current results lend support to researchers who have found conflicting results suggesting that parental monitoring is not associated with HRSB after accounting for other proximal risk factors.⁴⁷ Furthermore, some researchers have posited that other aspects of positive parenting are more influential than monitoring¹¹ in mitigating risk for HRSB. These have included parental warmth,⁴⁸ parent-child communication,⁴⁹ and relationship quality,⁵⁰ which have all been

linked to decreased rates of HRSBs. Future research should investigate whether these dimensions of positive parenting are influential in reducing rates of HRSB among low-income, urban adolescent males when multiple domains of risk are taken into account. Although the current sample's rate of sexual activity (66% had engaged in intercourse by age 18) is comparable to national samples (63% of 12th-grade male adolescents have engaged in sexual intercourse),⁵¹ the rates of condom use among sexually active male adolescents were lower than national rates, with 77% of sexually active participants indicating they did not use a condom (compared with 35% of sexually active 12th-grade male adolescents in national samples).⁵¹ As such, low-income sexually active adolescent males may be at particularly high risk for sexually transmitted infection and pregnancy.

Some study limitations should be noted. Participants were limited to boys from low-income families living in an urban setting. Therefore, the findings may not be generalizable to girls, children from higher SES samples, or nonurban settings. Additionally, the measure of HRSB is relatively narrow. The number of items and response frequency (never, 1–2 times, or ≥ 3 times) did not allow for a more detailed account of risk behaviors. Furthermore, participants' endorsements of "getting someone else pregnant" are limited to only the pregnancies that participants were aware of. A final limitation of this study is that our measures of deviant peer affiliation and parental monitoring were target- rather than peer- or parent-reported; however, other studies have suggested that perceptions of peers' antisocial activities²⁴ and parenting³¹ are associated with multiple types of adolescent high-risk health behaviors. Furthermore, perceptions of peers' behaviors are more highly correlated with risk behavior than peers' self-report³⁰ and adolescent perceptions of parenting have been shown to more accurately represent parental monitoring, because parents often overestimate their actual knowledge of their adolescent's activities.³² Therefore, target reports were retained for the current study.

CONCLUSIONS

The current study is one of the first to use longitudinal prospective data from multiple informants and methods to investigate pathways leading to adolescent HRSB beginning in early childhood in a sample of high-risk boys. Mothers' depressive symptoms and nurturant parenting in early childhood were associated with later adolescent HRSB through boys' deviant peer affiliation during emerging adolescence. Additionally, early adolescent daring was directly associated with later HRSB.

Finally, a large portion of the sexually active adolescents in the study endorsed having unsafe sex (77%) and a substantial minority reported having gotten someone else pregnant by age 20 (20%). These findings highlight the need for intervention programs and suggest

that interventions that focus on the influence of peers in teens' HRSBs may be particularly effective. Finally, the identification of early family factors may provide useful guidelines for individuals who may have a propensity to engage in HRSBs during adolescence

and would benefit from a family-based intervention program. Future research needs to explore whether similar pathways from early childhood to teen HRSB are in place for adolescent girls or for adolescents in rural or suburban settings.

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