

Socialization Influences on Early Adolescents' Cognitive Susceptibility and Transition to Sexual Intercourse

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This study examined the relationship between perceived socialization from parents, school, peers, and media and adolescents' cognitive susceptibility to initiating sexual intercourse and transition to intercourse 2 years later. Baseline and follow-up in-home Audio-Computer Assisted Self Interview surveys were completed by 854 Black and White male and female adolescents who, at baseline, were 12–14 years old and had not engaged in sexual intercourse. Results showed that stronger connections to parents and schools and less exposure to permissive sexual norms from peers and media were associated with less susceptibility and sexual behavior, especially among White adolescents. Susceptibility mediated 38–64% of the relations between parent and school socialization and sexual intercourse behavior, and mediated 28–53% of the peer and media socialization links to behavior. Findings provide support for social cognitive models of adolescents' behavior and suggest potential strategies for successful interventions to delay initiation of sexual intercourse.

Encouraging the postponement of sexual intercourse is important because teens who initiate first coitus before they are 16 years old engage in riskier sexual behavior and experience more adverse sexual health outcomes

than those who delay (Alexander & Hickner, 1997; Kirby, 2001; O'Donnell, O'Donnell, & Stueve, 2001). Identifying and intervening with younger adolescents who are likely to initiate sexual intercourse is necessary for prevention of later health problems. Interventions designed to delay the onset of sexual intercourse have had only limited success, however, except when targeted at younger adolescents (DiCenso, Guyatt, Willan, & Griffith, 2002; Jemmott & Jemmott, 2000; Kirby & Coyle, 1997; Moore & Brooks-Gunn, 2003). The more we know about the determinants of sexual intercourse and sexual abstinence, the more effective sexual risk reduction interventions for younger adolescents will be. Understanding differences among demographic subgroups that are known to initiate sexual intercourse at different rates (Grunbaum, Kann, & Kinchen, 2003) is also necessary for successful intervention. To date, knowledge about the sexual behavior of younger adolescents and the sexuality of precoital teens is limited (Albert, Brown, & Flanigan, 2003; Koch, 1993; Zabin & Hayward, 1993).

Social cognitive models identify individual-level cognitions that motivate and explain health behavior, with a particular focus on the social origins of behavior (Azjen & Fishbein, 1980; Bandura, 1986). The most effective adolescent sexual risk reduction programs, in fact, are based on social cognitive frameworks that aim to modify social influences and cognitions about sexual behavior (Kirby & Coyle, 1997). Cognitive-behavioral models such as Social Cognitive Theory (Bandura, 1986) and the Theory of Reasoned Action (Azjen & Fishbein, 1980) specify that behavior is mediated through cognitions (e.g., attitudes and intentions) and those cognitions are, in turn, shaped by the social environment (e.g., perceived family and peer norms). For adolescents who have not yet initiated sexual intercourse, social cognitive models suggest that specific socialization influences produce cognitions that are more or less supportive of initiating sexual intercourse which, in turn, determine the timing of first coitus.

In the present study, precoital adolescents' perceptions of sexual socialization from parents, school, peers, and media were analyzed to explain cognitive susceptibility to initiating sexual intercourse and to predict the transition to sexual intercourse 2 years later. Gender and race were tested as moderators of these relationships to provide additional insight about socialization processes among subgroups of adolescents. Mediation analyses using contemporaneous measures of adolescents' perceived sexual socialization and cognitive susceptibility were conducted to test whether the relationship between perceived socialization and the later onset of sexual intercourse could be explained by cognitive susceptibility, as cognitive-behavioral theoretical models posit. Although our capacity to

infer causal relationships between the socialization and susceptibility constructs is hindered by their contemporaneous assessment, mediation analysis is worthwhile because so few studies have examined cognitive precursors of initial sexual intercourse among early adolescents.

SEXUAL SOCIALIZATION

Sexual socialization is the process through which young people learn and internalize sexual knowledge, attitudes, skills, norms, and expectations for sexual relationships. People learn to be sexual within specific cultures and contexts, and socialization is a lifelong process that begins in childhood, increases considerably in adolescence, and continues throughout adulthood (Gagnon, 1990; Longmore, 1998). Key socializing agents in the development of sexual behavior include families, schools, peers, and mass media (Chapin, 2000; Luster & Small, 1994; Resnick et al., 1997), and adolescents report learning about sexuality from these sources (Kaiser Family Foundation, 1998; Sutton, Brown, Wilson, & Klein, 2002). Research suggests that socialization agents differentially impact adolescents' sexual behavior: Parents and schools are traditional and largely health promoting socialization agents, while peers and mass media often provide information that accelerates teens' sexual activity (L'Engle, Brown, & Kenneavy, 2006).

Families have an early and ongoing role in the socialization of children, and adolescents who have positive connections to their families and schools have less advanced sexual behavior. Adolescents who report high levels of connectedness to parents/family (Luster & Small, 1994; Resnick et al., 1997), parental monitoring of activities (Luster & Small, 1994; Romer et al., 1999), and frequent parent-teen communication about sex (DiIorio, Kelley, & Hockenberry-Eaton, 1999; Hutchinson, Jemmott, Jemmott, Braverman, & Fong, 2003) have later first coitus than peers. Adolescents who have a positive orientation toward school, as evidenced by feeling connected to school, receiving good grades, and expecting to continue through high school and/or college, also report later first coitus than teens with poor school connections and performance (Luster & Small, 1994; Resnick et al., 1997).

Parents and schools may delay the onset of sexual intercourse by instilling disapproving attitudes and expectations for delayed coitus. Prominent social attachment theories (e.g., social development [Hawkins & Weis, 1985], social control [Hirschi, 1969], and problem behavior [Jessor & Jessor, 1977]) posit that young people who are bonded to parents and schools will uphold the traditional norms and values of these

conventional socialization agents. Adolescents who possess strong connections to families and schools are likely to internalize values and standards that support postponing sexual intercourse, especially if adolescents are well aware that these socialization agents disapprove of teen sexual activity (Miller, 1998). Individuals are more likely to comply with the perceived behavioral standards of a specific person or social group if they desire approval from that group (Azjen & Fishbein, 1980). Therefore, parent and school models for conservative behavior will have a positive impact on adolescents' sexual cognitions and practices as long as adolescents look to and value conventional socialization agents for information about norms and behaviors (Azjen & Fishbein, 1980; Bandura, 1986).

Young people tend to shift their orientation from parents to peers during adolescence (Brown, 1990). A central developmental task for young people is gaining autonomy and developing close relationships with same and opposite-sex peers that help adolescents become more independent (Erikson, 1968). Peers may become more powerful sexual socialization agents than parents, particularly for information about sexual intercourse (DiIorio et al., 1999). Peers transmit sexual information that is often more accepting, and influential, than standards espoused by adults. When the sexual information supplied by peers is dominant, adolescents have an earlier transition to first coitus (DiIorio et al., 1999; Shah & Zelnik, 1981), and those who believe that peers approve of sexual activity and are sexually active are more likely to initiate intercourse (Alexander & Hickner, 1997; Kinsman, Romer, Furstenberg, & Schwarz, 1998; Romer & Stanton, 2003; Shah & Zelnik, 1981).

The mass media also provide models for sexual behavior. Adolescents use media frequently (Roberts, Foehr, & Rideout, 2004), and there is an abundance of sexual content in the media they use (Kunkel et al., 2003; Pardun, L'Engle, & Brown, 2005). Exposure to media content affects viewers' attitudes, norms, and behavior (Bandura, 1977; Chapin, 2000). The technical and normative information conveyed by media characters, who regularly practice risk-free, recreational, nonmarital sexual activity (Kunkel et al., 2003; Pardun et al., 2005), may be especially compelling to adolescents who rely on the media for sexual information, especially if media characters are perceived as attractive, realistic, and similar (Bandura, 1977; McAlister, 1995; Ward & Friedman, 2006). Exposure to sexual content across a variety of media (i.e., television, movies, music, magazines) is associated with greater intentions to initiate sexual intercourse and more advanced sexual behavior among adolescents (Brown et al., 2006; Collins et al., 2004; L'Engle, Brown, et al., 2006; Ward & Friedman, 2006).

SOCIALIZATION AND THE ONSET OF INTERCOURSE

Longitudinal studies of precoital adolescents suggest that there are important differences in precoital adolescents' *cognitive susceptibility* to the onset of sexual intercourse (L'Engle, Jackson, & Brown, 2006) that may be explained in part by global and domain-specific socialization processes that encourage or deter the onset of sexual behavior. Cognitive susceptibility is indicated by more permissive attitudes toward teen sexual behavior, a general sense of feeling ready for intercourse, greater perceived likelihood of initiating first coitus in the near future, and believing that if the opportunity was present one would engage in sexual intercourse (Forste & Haas, 2002; Jessor & Jessor, 1975; L'Engle, Jackson, et al., 2006; Miller et al., 1997; Whitaker, Miller, & Clark, 2000). Adolescents who are more susceptible to initiating sexual intercourse report weaker connections to conventional socialization agents and more exposure to permissive sexual norms than adolescents who postpone sexual intercourse, and they are more likely to experience first coitus within a year or two than less susceptible adolescents (Forste & Haas, 2002; Jessor & Jessor, 1975; L'Engle, Jackson, et al., 2006). Susceptibility has been linked to parent, school, religion, and peer influences, but media socialization and some important aspects of the socialization process (e.g., sexual communication; differences by race and gender) have received only limited attention.

In summary, the sexual socialization process can be modeled as follows: Influences from key socializing agents determine feelings and expectations for initiating sexual intercourse (i.e., cognitive susceptibility to sexual intercourse) that then determine sexual intercourse behavior. Although some have found that this model of sexual socialization is descriptive for all teens regardless of race or gender (Jessor & Jessor, 1977), other research suggests that the model is less appropriate for Black teens (Costa, Jessor, Donovan, & Fortenberry, 1995) and females (Udry & Billy, 1987). The present study analyzed the relationship between perceived socialization, susceptibility, and sexual intercourse behavior, and race and gender were tested as moderators of these relationships. Four hypotheses were tested:

Hypothesis 1: *Adolescents who are less connected to parents will report greater cognitive susceptibility to initiating intercourse and will be more likely to initiate sexual intercourse than adolescents who are more connected to parents. Cognitive susceptibility will mediate the relationship between adolescents' connections to parents and sexual intercourse behavior.*

Hypothesis 2: *Adolescents who are less connected to school will report greater cognitive susceptibility to initiating intercourse and*

will be more likely to initiate sexual intercourse than adolescents who are more connected to school. Cognitive susceptibility will mediate the relationship between adolescents' connections to school and sexual intercourse behavior.

Hypothesis 3: *Adolescents who report more exposure to permissive sexual norms from peers* will report greater cognitive susceptibility to initiating intercourse and will be more likely to initiate sexual intercourse compared with adolescents who report less exposure to permissive peer norms. Cognitive susceptibility will mediate the relationship between exposure to permissive *peer sexual norms* and sexual intercourse behavior.

Hypothesis 4: *Adolescents who report more exposure to permissive sexual norms from mass media* will report greater cognitive susceptibility to initiating intercourse and will be more likely to initiate sexual intercourse compared with adolescents who report less exposure to permissive media norms. Cognitive susceptibility will mediate the relationship between exposure to permissive *sexual norms in the media* and sexual intercourse behavior.

METHOD

Sample and Procedures

Seventh and eighth graders from 14 public middle schools in three central North Carolina school districts that included urban, suburban, and rural populations and approximately equal proportions of Black and White male and female students participated in a longitudinal study of teens' media use and health behavior. In fall 2001, brief informational sessions inviting students to participate were held at each school. Eighty-one percent of enrolled students ($N = 5,029$) provided useable contact information and were mailed a media use survey, and 65% ($N = 3,261$) returned the completed media survey with signed parental consent. In spring 2002, 1,200 adolescents who completed the media survey were randomly selected from within four equal-sized race and gender strata to complete an in-home Audio-Computer Assisted Self Interview (Audio-CASI) survey about their health and sexuality. Of these, 90% ($N = 1,074$) completed the Audio-CASI survey. The media and health survey samples were representative of the entire school population in terms of race, gender, and socioeconomic status.

Two years later, in spring 2004, 95% of the baseline health sample ($N = 1,017$) completed the follow-up in-home Audio-CASI survey. Before the 45-minute-long Audi-CASI survey was administered at baseline and

follow-up, the parent or guardian provided written consent for the teen's participation, and the adolescent provided written assent for completing the interview. Of the 57 respondents lost to follow-up, 6 were adolescent refusals, 7 were parent refusals, and the remaining 44 had moved out of the study area. There were no age, race, or gender differences between respondents who completed the follow-up survey and respondents who did not. Adolescents were given \$20 after completing each interview. Further details about the data collection protocols and sample characteristics are described in L'Engle, Pardun, and Brown (2004) and L'Engle, Jackson, et al. (2006). The protocols and measures used in this study were reviewed and approved by the university's Institutional Review Board.

Of the 1,017 respondents with longitudinal data, 129 (13%) reported sexual intercourse at baseline and were excluded from the present study. An additional 26 adolescents (3%) did not report their sexual intercourse behavior at baseline and 8 did not report their sexual intercourse behavior at follow-up. Therefore, 854 respondents (80% of the baseline health sample) who had not engaged in sexual intercourse at baseline and had complete longitudinal data formed the sample for the present analyses. The study sample was 46% Black, 48% male, and had a mean age of 13.7 years ($SD = .7$) at baseline. More than half of the respondents (53%) felt their physical development was similar to same-gender peers, 26% felt it was later, and 21% felt it was earlier.

Measures

Socialization variables. Perceived socialization from parents, schools, peers, and media was assessed at baseline. To the extent possible, these measures were based on standardized, validated instruments used with other samples of adolescents (CASA, 2001; Resnick et al., 1997). Media measures and questions about sexual communication were developed for the larger study of adolescents' mass media use and health behavior. A total of six focus groups were conducted with seventh graders from one school in each of the three school districts participating in the study to test the comprehensibility and relevance of measures for the early adolescent sample. Based on this feedback, some items were eliminated or revised before survey administration. Survey items and measurement properties are presented in Table 1, and means are presented in Table 2.

Susceptibility to initiating sexual intercourse. Five items measuring adolescents' cognitive predisposition to initiate sexual intercourse were

TABLE 1
Baseline Parent, School, Peer, and Media Socialization Measures

<i>Variable</i>	<i>Items</i>	<i>Response</i>	<i>Measurement</i>
Closeness with mother	How would you describe your relationship with your mother or female guardian?	1 = poor to 5 = excellent	Single item
Closeness with father	How would you describe your relationship with your father or male guardian?	1 = poor to 5 = excellent	Single item
"Hands-on" parenting (CASA, 2001)	Example items: (A) On weekends do you have to be home by a particular time at night? (B) How often do your parents or guardians try to monitor what you watch on TV? (C) How aware are your parents or guardians of how you're doing in school?	(A) 1 = no, 2 = yes; (B) 1 = almost never/never to 5 = almost always/always; (C) 1 = very aware to 4 = very unaware	8 items dichotomized and summed to form index. "Hands-on" responses coded as '1,' indicated by (A) = 2, (B) = 4 or 5, (C) = 1
Sexual communication with parents	Have you ever talked about how you should act on a date [consequences of not using birth control; AIDS or another STD] with your parents or guardian?	0 = no, 1 = yes	3 items summed to form scale ($\alpha = .72$)
School expectations (Resnick et al., 1997)	What do you think are the chances that you will graduate from high school? What do you think are the chances that you will go to college?	1 = no chance to 5 = definitely	2 items averaged to form scale ($\alpha = .72$)
School connectedness (Resnick et al., 1997)	(A) How happy are you to be at your school? (B) How much do you feel that your teachers care about you? (C) Since school started this year, how often have you had trouble getting along with your teachers?	(A) and (B) 1 = not at all to 5 = extremely; (C) 1 = every day to 5 = never	3 items averaged to form scale ($\alpha = .60$)
Grades	What grades did you get on your last report card?	1 = mostly Ds to 7 = mostly As	Single item

Perceived peer approval of teen sex	How would your friends feel about you having sex at this time in your life?	1 = strongly disapprove to 5 = strongly approve	Single item
Perceived peer sexual behavior	How many of your friends do you think have had sex?	1 = none to 4 = most	Single item
Sexual communication with friends	Have you ever talked about how you should act on a date [consequences of not using birth control; AIDS or another STD] with your friends?	0 = no, 1 = yes	3 items summed to form scale ($\alpha = .72$)
Media as sexual information source	Have you ever seen or heard about how you should act on a date [consequences of not using birth control; AIDS or another STD] from TV? Repeated for movies, music artists, and magazines.	0 = no, 1 = yes	3 items summed for each of 4 media (12 items total), then averaged to form scale ($\alpha = .82$)
Use of sexually explicit media	In the past 12 months, how often did you see X-rated movies? In the past 12 months, how often did you read magazines like <i>Playboy</i> , <i>Playgirl</i> , <i>Penthouse</i> , or <i>Hustler</i> ? How often do you view pictures of naked women or men on your computer or the Internet?	1 = never to 5 = more than once a week	3 items averaged to form scale ($\alpha = .65$)
Perceived sexual permission from media	The messages I get from TV [movies; music artists; magazines] are that it's OK for people my age to have sex.	1 = strongly disagree to 5 = strongly agree	4 items averaged to form scale ($\alpha = .90$)

12. School connectedness	-.24	-.12	.00	-.08	-.11	-.04	.24	.22	.22	-.02	.17
13. Grades	-.28	-.20	-.13	-.08	-.26	.00	.12	.19	.11	.02	.40
14. Perceived peer approval of teen sex	.56	.23	.11	.44	.26	.09	-.09	-.08	-.23	-.01	-.18
15. Perceived peer sexual behavior	.41	.29	.20	.05	.38	.06	-.13	-.13	-.19	.08	-.15
16. Friend communication	.12	.15	.13	-.20	.00	.09	-.06	-.05	-.08	.32	.08
17. Media as information source	.09	.16	.08	-.19	.15	.08	-.07	-.07	-.08	.36	.13
18. Use of sexually explicit media	.46	.20	.14	.30	.07	.04	-.11	-.08	-.21	-.7	-.11
19. Sexual permission from media	.25	.14	.04	.06	.02	.09	-.12	-.09	-.11	.04	-.05
Mean	1.5	.23	13.7	.48	.46	3.0	4.2	3.7	4.9	1.3	4.7
Standard deviation	1.6	.42	.69	.50	.50	.91	1.0	1.2	1.6	1.2	.59
Range	0-5	0-1	12-16	0-1	0-1	1-5	1-5	1-5	0-8	0-3	1-5

Note. Variables are scored so that higher values indicate higher levels of the construct. Correlations in bold are significant at $p < .05$.

used to indicate susceptibility at baseline. Item (1), "How likely is it that you will have sex in the next year?" and item (2), "How likely is it that you will have sex while you are in high school?" were scored from 1 = very unlikely to 4 = very likely. Item (3) was: "If you had a boyfriend/girlfriend, how sure are you that you could refuse to have sex with him/her if you didn't feel ready?" and was scored from 1 = extremely sure to 5 = extremely unsure. Item (4), "I think I'm ready to have sex," and item (5), "I believe it is OK for people to have sex before marriage if they are in love," were scored from 1 = strongly disagree to 5 = strongly agree. The two lowest (i.e., most conservative) response categories for each item were considered to represent nonsusceptibility; adolescents were assigned one point indicating susceptibility for each item that was not scored as "1" or "2." The five items were summed to form total susceptibility scores ranging from 0 to 5 (Cronbach's $\alpha = .77$). Evidence for the construct and predictive validity of this susceptibility measure is provided elsewhere (L'Engle, Jackson, et al., 2006).

Sexual intercourse status. Adolescents were classified as having engaged in sexual intercourse if they answered affirmatively to the question at follow-up: "Have you ever had sexual intercourse, that is, when a guy puts his penis into a girl's vagina?" Of the 854 adolescents in the study sample, 196 (23%) reported that they had sex by follow-up. Females and males reported similar rates of sexual intercourse, whereas 33% of Black teens reported intercourse at follow-up compared with 14% of White teens ($\chi^2 = 41.2, p < .001$).

Correlations among all variables used in analyses are presented in Table 2.

Data Analysis

Regression analyses were used to examine the associations between baseline perceived socialization and baseline susceptibility, and between baseline perceived socialization and follow-up sexual intercourse status. All regression analyses controlled for age, gender, race, and pubertal timing relative to peers. Two-way interactions between each socialization variable and race and each socialization variable and gender were tested in regression models, and if significant interactions were found regression analyses were conducted among adolescent subgroups.

Mediation analyses followed the recommendations of Kenny and colleagues (Baron & Kenny, 1986; Kenny, Kashy, & Bolger, 1998) and

MacKinnon and Dwyer (1993), except that adolescents' reports of perceived sexual socialization and our purported mediator variable (cognitive susceptibility) were both measured during the baseline interview. (Throughout this report, the term "mediator" is used with the acknowledgment that contemporaneous assessment of predictor and mediator variables leaves ambiguity as regards any causal relationship between these variables.) Initial regression models were estimated to establish that the necessary conditions for mediation held. First, using logistic regression, sexual intercourse status was regressed on susceptibility to document that the proposed mediator was related to the outcome. Second, sexual intercourse status was regressed on each individual socialization variable (τ reduced to τ' in mediation analyses) using logistic regression. Third, cognitive susceptibility was regressed on each socialization variable (α) using linear regression.

Finally, each socialization variable that was significantly associated with susceptibility and sexual intercourse status in the initial regression models at the $p < .05$ level was subject to mediation testing. If a significant interaction was found, mediation testing was limited to the subgroup in which the socialization variable was significantly associated with both susceptibility and sexual intercourse status. For each test of mediation, sexual intercourse status was regressed on cognitive susceptibility while controlling for socialization variables (β) using logistic regression (see Komro et al., 2001, for a visual representation of the mediation model). One model was estimated for each socialization variable.

Parameter estimates and standard errors from the regression equations were used to test whether the association between the predictor and outcome was significantly reduced when the mediator was added to the model. Because the outcome variable—sexual intercourse status—was a binary variable, regression coefficients and standard errors in the logistic models were standardized before estimating mediation (MacKinnon & Dwyer, 1993). In logistic regression, error variances are fixed, and thus the scale depends on the variables in the model, whereas in linear regression error variances are observed and constant across models. Scales were made equivalent across logistic models by standardizing logistic regression coefficients. The significance of the mediated effect was then calculated by dividing the mediated effect ($\alpha\beta$) by the standard error of the mediated effect (square root of $\beta^2 s_{\alpha^2} + \alpha^2 s_{\beta^2}$) to create a z-statistic for testing whether the mediated effect was different from zero (Sobel, 1982). The percent of the total effect that was mediated by susceptibility was also calculated ($\alpha\beta/\alpha\beta + \tau'$) (Shrout & Bolger, 2002).

RESULTS

Initial Regression Models

Greater susceptibility at baseline predicted greater odds of initiating sexual intercourse by follow-up (OR = 1.64, 95% CI 1.5–1.8, $p < .001$), showing that the proposed mediator is related to the sexual intercourse outcome.

The two initial sets of regression models tested the relationship between perceived socialization and susceptibility and sexual intercourse status controlling for age, gender, race, and pubertal timing. Results are presented in Table 3; susceptibility results are shown in the first three columns, and sexual intercourse results are shown in the final two columns. Where a significant two-way interaction between the socialization variable and race or gender was found, results are reported for each subgroup. Data provided partial support for Hypothesis 1: Reported closeness with mother and more “hands-on” parenting were associated with less susceptibility and with lower odds of initiating intercourse. Race interacted with “hands-on” parenting in predicting sexual intercourse (OR = 1.26, 95% CI 1.0–1.6, $p < .05$), such that greater “hands-on” parenting predicted lower odds of initiation only for White adolescents. Closeness with father was not predictive of sexual intercourse, and contrary to expectations sexual communication with parents predicted greater odds of initiation for males (gender by sexual communication interaction: OR = 1.64, 95% CI 1.2–2.2, $p < .01$).

More positive school connections had an inverse association with susceptibility and sexual intercourse status, as expected in Hypothesis 2, although these findings were stronger for White adolescents than Black adolescents. Higher school expectations, greater school connectedness, and better grades in school were associated with lower susceptibility scores. Lower odds of initiating sexual intercourse at follow-up were also significantly predicted by higher school expectations at baseline among all adolescents, and greater school connectedness and better grades among White adolescents (race by school connectedness interaction: OR = 1.93, 95% CI 1.1–3.3, $p < .05$; race by grades interaction: OR = 1.38, 95% CI 1.1–1.7, $p < .001$).

Strong support was demonstrated for Hypothesis 3: Adolescents who reported permissive peer norms were more susceptible and more likely to transition to intercourse. Perceived peer approval of teen sexual behavior and perceived peer sexual behavior were strongly related to greater susceptibility and higher odds of intercourse. More sexual communication with friends was also associated with higher susceptibility and higher

TABLE 3
 Susceptibility and Sexual Intercourse Status Regressed Independently on Each Socialization Variable, Controlling for Age, Gender, Race, and Pubertal Timing

Socialization Factors ^a	Mean Susceptibility to Onset of Sexual Intercourse			Odds of Sexual Intercourse (0 = No, 1 = Yes)	
	B	Standard Error	β	OR	95% CI
Parents					
Closeness with mother	-.24	.05	-.14***	.81*	.69, .96
Closeness with father	-.14	.04	-.11**	.98	.85, 1.2
“Hands-on” parenting					
Whites	-.26	.04	-.28***	.73***	.61, .87
Blacks	-.30	.05	-.28***	.94	.82, 1.1
Sexual communication with parents					
Females	-.09	.05	-.09	.88	.72, 1.1
Males	.08	.07	.06	1.45***	1.2, 1.8
School					
School expectations	-.47	.09	-.17***	.73*	.56, .95
School connectedness					
Whites	-.52	.10	-.22***	.44***	.30, .67
Blacks	-.47	.12	-.18***	.89	.63, 1.2
Grades					
Whites	-.28	.05	-.25***	.66***	.55, .79
Blacks	-.16	.05	-.15***	.96	.82, 1.1
Peers					
Perceived peer approval of teen sex	.62	.05	.47***	1.64***	1.4, 1.9
Perceived peer sexual behavior	.69	.07	.35***	1.78***	1.4, 2.2
Sexual communication with friends					
Whites	.26	.06	.20***	1.71***	1.3, 2.2
Blacks	.22	.07	.16***	1.14	.95, 1.4
Media					
Media as sexual information source	.21	.06	.12***	1.39**	1.1, 1.7
Use of sexually explicit media	.35	.03	.36***	1.30***	1.2, 1.4
Perceived sexual permission from media	.35	.05	.21***	1.37***	1.2, 1.6

Note. Variables in bold were retained for mediation analyses.

^aSocialization variables are scored so that higher values indicate greater levels of the construct.

p* < .05, *p* < .01, ****p* < .001.

odds of initiating intercourse among White teens (race by sexual communication interaction: OR = .62, 95% CI .45–.85, $p < .01$).

Exposure to permissive sexual norms in the media was also strongly related to more susceptibility and sexual intercourse, as predicted in Hypothesis 4. Seeing media as a source for sexual information was related to greater susceptibility and higher odds of intercourse. Adolescents who used more sexually explicit media were more susceptible and more likely to have transitioned to intercourse at follow-up. Perceived sexual permission from the media was also associated with greater susceptibility and greater odds of intercourse.

Mediating Effects

Mediated effects were estimated using the full sample or the demographic subgroup that met Baron and Kenny's (1986) criteria for testing. Socialization variables that had significant associations with both susceptibility and sexual intercourse status at the $p < .05$ level were retained for mediation analyses; retained variables are printed in bold in Table 3.

Tests of cognitive susceptibility as a mediator of the relationship between perceived socialization reported by seventh and eighth graders and sexual intercourse status 2 years later provided consistent support for all four hypotheses. Susceptibility was a significant mediator of adolescents' connections to conventional socialization agents (Table 4) and exposure to permissive sexual norms (Table 5). Decomposing the total effect (τ) into the direct effect attributed to each socialization variable (τ') and the indirect effect operating through susceptibility ($\alpha\beta$) showed that the association between each socialization variable and sexual intercourse status was significantly lower when susceptibility was included in the model. In these analyses, the relationship between susceptibility and sexual intercourse status remained significant and of approximately equal magnitude even after the addition of socialization variables (results available from the authors).

Cognitive susceptibility mediated the association between parent and school connectedness and sexual behavior, per Hypotheses 1 and 2 (see Table 4). For example, the standardized regression coefficient showing the total effect of adolescents' reported closeness with their mothers on the prediction of sexual intercourse status was $\tau = .093$, but the direct effect of closeness with mother was only $\tau' = .036$ while the indirect effect through cognitive susceptibility was $\alpha\beta = .053$ (Table 4, row 1). The mediated effect was smaller or about equal to the direct effect for three of the five parent and school socialization variables tested, however, indicating that these

TABLE 4
Standardized Mediation Results for Parent and School Socialization Effects on Sexual Intercourse Status: Total Effect, Direct Effect, Mediated Effect Through Susceptibility, and Percent Mediated, Controlling for Age, Gender, Race, and Pubertal Timing

	Total Effect (τ)	Direct Effect (τ')	Mediated Effect			Percent Mediated ($\alpha\beta/\alpha\beta+\tau'$)
			Estimate ($\alpha\beta$)	Standard Error	Z Statistic ^a	
Closeness with mother	.093	.036	.053	.014	3.78	59.6
"Hands-on" parenting (White adolescents)	.163	.082	.080	.018	4.38	49.4
School expectations	.163	.062	.110	.025	4.41	64.0
School connectedness (White adolescents)	.416	.261	.161	.041	3.90	38.2
Grades (White adolescents)	.189	.115	.076	.019	3.92	39.8

^aAll mediated effects are significant at $p < .001$.

TABLE 5
Standardized Mediation Results for Peer and Media Socialization Effects on Sexual Intercourse Status: Total Effect, Direct Effect, Mediated Effect Through Susceptibility, and Percent Mediated, Controlling for Age, Gender, Race, and Pubertal Timing

	Total Effect (τ)	Direct Effect (τ')	Mediated Effect			Percent Mediated ($\alpha\beta/\alpha\beta+\tau'$)
			Estimate ($\alpha\beta$)	Standard Error	Z Statistic ^a	
Perceived peer approval of teen sex	-.123	-.077	-.057	.011	5.21	42.6
Perceived peer sexual behavior	-.203	-.124	-.089	.017	5.30	41.7
Sexual communication with friends (White adolescents)	-.268	-.179	-.079	.022	3.58	30.6
Media as sexual information source	-.169	-.122	-.047	.015	3.23	28.0
Use of sexually explicit media	-.132	-.067	-.074	.013	5.80	52.6
Perceived sexual permission from media	-.161	-.081	-.080	.016	4.97	49.2

^aAll mediated effects are significant at $p < .001$.

socialization processes have substantial direct effects on adolescents' sexual behavior that are not related to cognitive susceptibility. Among all teens in the sample, susceptibility mediated approximately 60% of the relationship between closeness with mother and sexual intercourse behavior and 64% of school expectations. For White teens, susceptibility mediated 49% of "hands-on" parenting, 38% of school connectedness, and 40% of adolescents' school grades.

Mediation results also provided support for Hypotheses 3 and 4. As shown in Table 5, susceptibility mediated 43% of the relationship between perceived approval of teen sex and sexual intercourse status, 42% of perceived peer sexual behavior, and 31% of White teens' sexual communication with friends. For media socialization, susceptibility mediated 28% of the relationship between media as a source of sexual information and sexual intercourse behavior, 53% of the use of sexually explicit media, and 49% of perceived sexual permission from the media. These results show that peer and media socialization processes are directly related to teens' sexual behavior as well as mediated through adolescents' cognitive susceptibility. For instance, the direct effect of perceived peer approval of teen sex on sexual intercourse status was $\tau' = -.077$, while the mediated effect related to susceptibility was $\alpha\beta = -.057$ (Table 5, row 1).

DISCUSSION

This research provides some support for social cognitive models of health behavior (Ajzen & Fishbein, 1980; Bandura, 1986). A substantial but limited proportion of the relations between sexual behavior and perceived sexual socialization from parents, school, peers, and mass media was mediated by cognitions about initiating intercourse. All study hypotheses were supported, although some hypothesized relationships were evident only among White adolescents or female teens. Cognitive susceptibility mediated 49–60% of the parent socialization variables, 38–64% of the school variables, 31–43% of the peer variables, and 28–53% of the media variables. (Mediation tests were not indicated for several socialization variables assessed among Black adolescents; therefore, the percentages reported here apply to hands-on parenting, school connectedness, grades, and sexual communication with friends only among White adolescents.) A variable that predicts 30% of the variance in an outcome has a moderate effect and one that accounts for 50% of the variance has a large effect (Cohen, 1988); these analyses therefore indicate that susceptibility is likely an important mediator of the adolescent sexual socialization–behavior relationship.

Considering that many sexual risk-reduction interventions are guided by social cognitive frameworks, these results could be helpful in research and intervention planning. Our findings support the view (Jessor & Jessor, 1975, 1977) that adolescents who are establishing independence from parents and other adult-sanctioned institutions, and who are turning to peers and media for information about sexual relationships, are more ready psychologically for the onset of sexual intercourse and more likely to experience first coitus. The pattern of results found here are important because they apply to early adolescents, are evident before adolescents initiate sexual intercourse, and predict the initiation of sexual intercourse over 2 years. Results also highlight the importance of the media as a sexual socialization agent and how the sexual socialization process may function differently for Black and White and male and female adolescents.

Cognitive Susceptibility

This study makes an important contribution to understanding the role of sexual cognitions as antecedents of sexual behavior from early to middle adolescence. Some scholars have suggested that intentions to have sexual intercourse (Kinsman et al., 1998), age expectations for the initiation of coitus (Rosenthal & Smith, 1997), and feelings about engaging in sexual intercourse (Romer & Stanton, 2003) might explain the relationship between peer norms and sexual behavior, but hypotheses regarding intervening variables are seldom tested in adolescent sexual behavior research (see Romer and Stanton, 2003, for an exception).

The measure of cognitive susceptibility to sexual intercourse could serve as an additional outcome variable worth examining in primary prevention programs, and it could be analyzed as an intervening variable that might explain program results (MacKinnon & Dwyer, 1993). For example, if a program to increase parental monitoring of teens was unsuccessful in delaying the onset of sexual intercourse, one explanation for the result could be the lack of program effects on adolescents' cognitions about sexual behavior (Romer et al., 1999). Although such analyses have been conducted for alcohol and tobacco prevention interventions (Komro et al., 2001; MacKinnon, Taborga, & Morgan-Lopez, 2002), they are rare in adolescent sexual behavior research.

Socialization and Sexual Intercourse

Adolescents who reported close relationships with parents and stronger parental monitoring were less susceptible and less likely to initiate sexual

intercourse. Although Romer et al.'s (1999) cross-sectional study of 9–17-year-old urban Black youth showed that greater parental monitoring delayed age at first coitus, in the present longitudinal study of somewhat older adolescents who reside in urban, suburban, and rural areas, the perception of “hands-on” parenting was predictive of lower odds of intercourse initiation only for White adolescents. Greater “hands-on parenting” was associated with less susceptibility in middle school for both White and Black teens, however, and closeness with mother was predictive of delayed intercourse for all teens regardless of race. The measure of adolescents’ closeness with mothers used in the present study is their rating of the quality of the relationship, which may both influence and be influenced by adolescents’ disclosure of information about themselves to their parents. For example, teens who have positive relationships with their mothers may be more likely to disclose information, just as those who have risk behaviors to hide may reveal less information and report less closeness to their parents. Analyses by Kerr and Stattin (2000) suggest that parents’ knowledge of their adolescents’ activities—gained largely through adolescents’ disclosures to their parents—is the most important predictor of adolescent adjustment (e.g., delinquency, school problems, deviant peers). Further study of this aspect of parent–teen relationships should help elucidate the specific features of parenting that reduce adolescents’ problem behavior.

The health-promoting role of school connectedness in influencing adolescents’ sexual behavior has received less attention, especially in recent years, than family effects. In the present study, feeling good about being in school, expecting to finish high school and attend college, and receiving better grades emerged as important factors associated with delayed sexual behavior, especially among White adolescents. Other studies also have found that educational goals and achievement are more highly related to the onset of sexual intercourse among White adolescents than Black adolescents (Billy, Landale, Grady, & Zimmerle, 1988; Schvaneveldt, Miller, Berry, & Lee, 2001).

Social development interventions aim to improve adolescents’ connections to schools, families, and other conventional socialization agents (Hawkins, Catalano, Kosterman, Abbott, & Hill, 1999; Kirby, 2001). This study underscores the relevance of these programs by documenting that adolescents who report positive relationships with schools and parents have lower expectations for initiating coitus and less likelihood of experiencing first coitus before middle adolescence. Notably, few parent and school socialization variables predicted Black teens’ transition to sexual intercourse in high school, although connections to parents and schools were significantly associated with susceptibility in middle school. These

results suggest that conventional socialization agents may be most important to Black youth during the early teen years, and that promoting positive connections with parents and schools during middle or later adolescence may have less impact on Black teens' sexual behavior than White teens. In line with other studies (Grunbaum et al., 2003), Black teens in our sample were more sexually experienced than White teens, so it is possible that if the transition to sexual intercourse had been assessed earlier Black teens' reports of parent and school socialization processes would have been stronger predictors of sexual behavior.

As expected, reports of sexual socialization from peers and media showed robust associations with adolescents' cognitive susceptibility and sexual intercourse behavior. Using the media as a source for sexual information, attending to sexually explicit media, and perceiving that the mass media approve of teen sexual behavior were associated with greater susceptibility and the transition to intercourse. These data demonstrate that adolescents' reports of exposure to sexier media and more sexually active peers are similarly related to behavior; indeed, some have referred to the mass media as a sexual "super peer" because of the similar socializing role of peers and media during adolescence (Brown, Halpern, & L'Engle, 2005; L'Engle, Brown, et al., 2006). These findings also suggest avenues for sexual risk reduction interventions, although it has proven difficult to enact interventions that can reduce adolescents' exposure to risky sexual messages in the media (Brown, Steele, & Walsh-Childers, 2002).

Methodological Issues

In mediation analyses, it is important to scrutinize study design and power. Because the mediation model implies a causal chain, the ideal study involves experimental manipulation of the predictor variable and three or more longitudinal data points (Shrout & Bolger, 2002). In the present study, a causal model is consistent with the data, and some use of longitudinal data strengthens this conclusion. However, because the socialization factors and susceptibility were measured contemporaneously, the direction of influence cannot be determined. It is possible that as adolescents feel increasingly ready for the onset of intercourse, they become disengaged from their parents and schools, seek sexual information from peers and the mass media, and perceive social norms that approve of sexual behavior. A longitudinal study with three or more waves of data collection would help to rule out the alternative model in which cognitive susceptibility causes self-selected exposure to sexuality socialization. To further explore this alternative model, mediation analyses were

conducted in reverse so that socialization variables were treated as the mediators of the susceptibility–behavior relationship. These results demonstrated very limited mediation (results available from the authors), suggesting that the sexual socialization model tested in the present study is a more accurate representation of the data.

Three aspects of the present study suggest there was sufficient power to detect mediation: first, the sample size was sufficient to detect small to medium effects (MacKinnon, Lockwood, Hoffman, West, & Sheets, 2002); second, most of the correlations between socialization variables and susceptibility, and susceptibility and sexual intercourse status, were comparable and not too large (Kenny et al., 1998); and third, the cognitive susceptibility mediator had adequate reliability (Baron & Kenny, 1986).

The focus on heterosexual behavior among youth who had not yet initiated sexual intercourse by seventh or eighth grade limits the generalizability of results. It is likely that the experience of some sexual minority youth was not accounted for, and the study results may not apply to the earliest initiators who were mostly Black teens. In addition, the measurement of the socialization variables could be improved, in that some constructs were assessed with single items and the reliability of several scales was low.

Finally, socialization processes were self-reported by adolescents instead of being assessed directly, which raises the possibility of inaccurate representation of socialization influences. Adolescents are more than passive recipients of sexual socialization, but instead play a major role in selecting media, choosing their friendship groups, and disclosing information to parents about their activities. Considering that more sexually active teens may choose more sexual media (Brown et al., 2002) and more sexually active friends (Billy & Udry, 1985), media and peer socialization effects may be overestimated. Similarly, adolescents' reports of "hands-on" parenting and closeness with parents may be partial reflections of adolescents' disclosures to parents, such that adolescents' reports of parental monitoring and connectedness may reflect more about the adolescents' characteristics and behavior than the parents' conduct (Kerr & Stattin, 2000). Adolescents who engage in sexual activity, for example, may reveal little information to their parents about their activities and thus report a limited amount of parental monitoring.

Conclusion

This study provides support for using social cognitive models to understand adolescents' transition to sexual intercourse. Positive connections to

parents and schools, especially among White teens, and relatively less exposure to permissive sexual norms from peers and media had health promoting associations with teens' sexual behavior. Adolescents' reports of socialization from these sources were related to their cognitive susceptibility, which was in turn predictive of the onset of sexual intercourse. Programs that seek to change sexual socialization influences may result in delayed sexual behavior by decreasing adolescents' susceptibility to intercourse. Interventions focused on adolescents' feelings and expectations about the onset of intercourse could help to postpone first coitus among young adolescents.

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