

Neighborhood Poverty and Early Transition to Sexual Activity in Young Adolescents: A Developmental Ecological Approach

Véronique Dupéré and Éric Lacourse
Université de Montréal

J. Douglas Willms
University of New Brunswick

Tama Leventhal
Tufts University

Richard E. Tremblay
Université de Montréal

This study examined how the link between neighborhood poverty and the timing of sexual initiation varies as a function of age, gender, and background characteristics. A sample of $N = 2,596$ predominately White Canadian adolescents from the National Longitudinal Survey of Children and Youth was used. Sexual initiations occurring between 12 and 15 years old were considered. Results showed that younger adolescent females who lived in poor neighborhoods and who had a history of conduct problems were more likely to report early sexual activity. Peer characteristics partly accounted for this susceptibility. Among adolescent males, no direct neighborhood effects were found, but those who had combined risks at multiple levels appeared more vulnerable. The theoretical and practical implications of these findings are discussed.

For many adolescents, sexual experimentation includes navigating the transition to first heterosexual intercourse, an event that becomes relatively common by the end of adolescence (Darroch, Frost, Singh, & Study Team, 2001). Although this transition becomes normative by middle to late adolescence, a small group of adolescents experience it much sooner. In particular, about 5% have had sex at 12 years of age in the United States; this rate gradually rises to around 10% at age 13 and 19% at age 14 (Albert, Brown, & Flanigan, 2003). Compared with later initiators, early initiators are much more likely to contract sexually transmitted diseases, undergo unwanted teen pregnancy, and report involuntary sexual experiences (e.g., Albert et al., 2003; Kaestle, Halpern, Miller, & Ford, 2005). Reports of such negative experiences decrease sharply for those transitioning in later adolescence. Despite the significance of sexual initiation in early adolescence, a recent review noted that its determinants have been understudied (Albert et al., 2003). This is problematic because the processes at play in older adolescents do not automatically apply

to their younger peers. Just as the consequences of sexual activity dramatically change as adolescents mature, developmentally oriented researchers proposed that its determinants must also fluctuate at different developmental stages (Whitbeck, Yoder, Hoyt, & Conger, 1999).

In this study, we propose that both developmental (i.e., age) and contextual (i.e., neighborhood and peers) factors need to be considered simultaneously to adequately understand the determinants of the timing of sexual initiation. Adolescence is a period of intensified participation in larger social contexts outside the home, such as neighborhoods and peer groups, and these contexts are thought to exert powerful influences upon adolescent development, including sexuality (Browning, Leventhal, & Brooks-Gunn, 2004). The current study adopts an ecological, developmental approach to examine the timing of young adolescents' sexual initiation. That is, longitudinal data are used to explore how the relationship between neighborhood poverty and sexual initiation and hypothesized mediators (i.e., peer characteristics) vary with age among adolescent males and females. In addition, the moderating role of neighborhood circumstances on family and individual risk factors is examined.

This study was based on the doctoral dissertation of the first author, who was supported by a scholarship from Social Sciences and Humanities Research Council of Canada. The authors wish to thank Eric Dion and anonymous reviewers for comments on previous drafts. The research and analysis are based on data from Statistics Canada, and the opinions expressed do not necessarily represent the views of Statistics Canada.

Correspondence concerning this article should be addressed to Eric Lacourse, Département de Sociologie, Université de Montréal, CP 6128, succursale Centre-Ville, Montréal, Québec, Canada H3C-3J7. Electronic mail may be sent to eric.lacourse@umontreal.ca.

© 2008, Copyright the Author(s)
Journal Compilation © 2008, Society for Research in Child Development, Inc.
All rights reserved. 0009-3920/2008/7905-0016

Neighborhood Disadvantage and Early Transitions to Sexual Activity: Potential Moderators

Ecological models of human development suggest that the neighborhood environment is an important context for development (Bronfenbrenner, 1979). Correspondingly, studies have repeatedly found a link between neighborhood disadvantage and a number of risky adolescent sexual outcomes, such as inconsistent contraceptive use or teenage childbearing (Baumer & South, 2001; Leventhal & Brooks-Gunn, 2000). In contrast, studies investigating the link between neighborhood disadvantage and *timing* of sexual initiation have produced mixed results. Some found independent effects of neighborhood structural characteristics (i.e., poverty) over and above other important determinants (e.g., Browning et al., 2004; Ramirez-Valles, Zimmerman, & Juarez, 2002), whereas others did not (e.g., Baumer & South, 2001; Upchurch, Aneshensel, Sucoff, & Levy-Storms, 1999). Sample differences in terms of participants' characteristics, notably age and gender, might explain these inconsistencies.

Theoretical and empirical considerations suggest that the association between neighborhood disadvantage and sexual initiation could vary as a function of age. The developmental model proposed by Whitbeck et al. (1999) argues that exposure to nonnormative social contexts, such as deviant peers, should predict transitions occurring in early adolescence when the transition is clearly nonnormative and gradually lose predictive power as adolescents mature and the transition becomes more normative. Although they did not explicitly discuss neighborhood factors, their reasoning suggests that neighborhood disadvantage could be associated with sexual initiation in early adolescence, but not necessarily at later ages, given that neighborhood effects are often interpreted as a consequence of exposure to neighborhood deviant peers (Baumer & South, 2001). Also, younger teens may be especially susceptible to peer pressure and peer norms (Brooks-Gunn & Furstenberg, 1989). Empirical evidence indirectly supports the hypothesis of age-graded neighborhood effects on sexual initiation because significant effects have tended to be observed in comparatively younger samples. For instance, Browning et al. (2004) obtained significant neighborhood effects when modeling transitions occurring between 11 and 16 years old, whereas others did not, in samples followed throughout adolescence and into early adulthood (Baumer & South, 2001).

Gender is also likely to moderate the association between neighborhood disadvantage and early sexual activity. If sexual activity represents a departure from the norm for early adolescents, it is especially the

case for females. Norms tend to recommend chastity for adolescent females, whereas sexual experimentation is often tacitly encouraged in males (Benda & DiBlasio, 1994). Echoing these diverging norms, sexually active adolescent females are more likely to be labeled negatively by their peers and to express remorse and regrets regarding their early sexual experiences, as compared with adolescent males (Dickson, Paul, Herbison, & Silva, 1998; Graber, Brooks-Gunn, & Galen, 1998). Because social norms tend to disapprove early sexual activity more strongly among adolescent females, exposure to more permissive norms might be especially influential for them. Empirical results suggest that in disadvantaged neighborhoods, young adolescent females are more likely to be exposed to alternative cultural scripts regarding sexuality (Harding, 2007). For instance, Harding (2007) found that in disadvantaged neighborhoods, a sizable minority of adolescents tend to view adolescent pregnancy in a positive light, whereas in more advantaged neighborhoods, there is a general consensus to view adolescent pregnancy as a negative event. Adolescent females appear especially sensitive when exposed to such alternative scripts. Indeed, exposure to peers having more permissive attitudes and behaviors toward sexuality has been found to predict entry into sexual activity for adolescent females but not for adolescent males (Billy & Udry, 1985). For this reason, adolescent females' sexual behavior could be generally more susceptible to neighborhood effects.

On average, adolescents living in poor neighborhoods are at an increased risk of being exposed to alternative cultural scripts regarding sexuality (Harding, 2007), but there is certainly a great deal of individual variability in the degree and intensity of exposure. Mounting evidence shows that key family and individual characteristics modulate neighborhood effects. At the family level, low socioeconomic status (SES), family disruption, and residential instability are factors likely to increase exposure to neighborhood peers with more permissive attitudes. For instance, single parents tend to have fewer resources to exert effective supervision than two-parent families and inconsistent supervision is more strongly associated with early sexual activity for adolescents living in disadvantaged neighborhoods (Browning, Leventhal, & Brooks-Gunn, 2005). Also, residentially unstable adolescents are at risk of making new deviant friends when they move into a new neighborhood and this, in turn, increases the likelihood of early initiation (South, Haynie, & Bose, 2005). This association could be especially strong among adolescents moving into a disadvantaged neighborhood. At the individual

level, neighborhood disadvantage might also exacerbate the accelerating impact of early pubertal development and conduct problems, two characteristics associated with early sexual activity (Browning et al., 2004). Indeed, neighborhood disadvantage increases the chances that such predisposing individual characteristics actually translate into problem behaviors (e.g., Obeidallah, Brennan, Brooks-Gunn, & Earls, 2004). Thus, there are good reasons to consider family and individual characteristics not only as statistical controls but also as potential moderators of neighborhood effects.

*Neighborhood Poverty and Early Sexual activity:
A Peer Mediation Model*

So far, we have argued that neighborhood disadvantage may be associated with early sexual activity and that this association may vary as a function of individual and family characteristics. This section now addresses potential explanations for neighborhood effects. Theoretical and empirical considerations suggest that “peers may be the primary agent through which community socialization adversely affects adolescents” (Leventhal & Brooks-Gunn, 2000, p. 327). Previous research suggests that adolescents are more likely to affiliate with deviant peers if they live in a disadvantaged neighborhood (Brody et al., 2001) apparently because of a reduced collective capacity to supervise and control youth groups in these contexts (Sampson, Morenoff, & Gannon-Rowley, 2002). The proposition that peer processes are important mediators of neighborhood effects has been repeatedly supported in the delinquency literature (e.g., Ingoldsby et al., 2006; Simons, Johnson, Beaman, Conger, & Whitbeck, 1996).

Recent findings suggest that peer factors may play a primary mediating role for sexual risk taking as well. When examining the mediating role of a host of potential explanatory processes for neighborhood effects on adolescents’ sexual behaviors, Baumer and South (2001) found that the sole peer characteristic that they considered, a composite measure of peer attitudes and behaviors, was the only variable with a significant, although partial, mediating effect. The present study builds on these findings by considering the mediating role of peer deviance and of involvement with an older sexual partner. These characteristics were selected because evidence suggests that they are associated with both neighborhood disadvantage and early sexual activity. We briefly outline this evidence below.

Affiliation with deviant peers is one of the prominent risk factors for early sexual initiation (e.g.,

French & Dishion, 2003), most likely because deviant peers provide a pool of willing partners and cultivate a sense that early sexual activity is desirable. Deviant peer affiliation could mediate neighborhood effects, given that neighborhood disadvantage is a risk factor for deviant peer affiliation (e.g., Brody et al., 2001). Involvement with an older partner is another potential explanatory factor, especially for adolescent females. Indeed, although getting involved with an older partner increases the risk of early sexual activity for both adolescent males and females (Marin, Coyle, Gomez, Carvajal, & Kirby, 2000), this situation is rare among adolescent males and affects a much greater proportion of females (Halpern, Kaestle, & Hallfors, 2007), especially young, early-maturing females (Manlove, Ryan, & Franzetta, 2007). This may be attributable to the attractiveness of young, physically developed adolescent females to older males (Caspi, Lynam, Moffitt, & Silva, 1993; Halpern et al., 2007). Certain contexts, such as disadvantaged neighborhoods, may increase the likelihood that physically mature adolescent females affiliate with older peers and engage in risky behaviors (Obeidallah et al., 2004). Thus, differential exposure to older partners and deviant peers could potentially explain neighborhood effects on the timing of sexual initiation.

In this study, a developmental, ecological perspective is adopted to examine young adolescents’ transitions to first sexual activity. A representative sample of Canadian adolescents is used to explore how the relationship between ecological risk factors (neighborhood disadvantage), hypothesized mediators (peer characteristics), and sexual initiation varies with age. In addition, the moderating effects of other factors that could alter adolescent susceptibility to neighborhood circumstances, such as gender and individual characteristics, are considered. We hypothesize that peer characteristics would at least partly account for this vulnerability.

Method

Sample

The National Longitudinal Survey of Children and Youth (NLSCY) is a nationally representative, prospective study of Canadian children and adolescents (Statistics Canada, 2005). The sample design is a clustered probability sample of private households within the 10 Canadian provinces, excluding children living in remote areas, institutional settings, and on First Nations reserves. The NLSCY was launched in 1994–1995, with follow-up surveys conducted every 2 years

thereafter. Initially, 13,439 households of 15,579 identified as having at least one dependent child, ages newborn to 11 years, agreed to participate in Cycle 1 of the study. Within each household, up to two children per family were selected to participate in the longitudinal survey, resulting in a longitudinal sample of 16,903. In each of the survey households, the "person most knowledgeable" about the child was interviewed. In virtually all cases, this person was a parent and in most cases the mother and hereafter is referred to as such. From 10 years old on, children were also asked to complete self-report questionnaires.

This study uses data from the first five data collection cycles (1994–1995 to 2002–2003). Because questions about age at sexual initiation were consistently included in the survey only for participants of at least 16 years old, the subsample used includes older NLSCY participants who were at least 16 years old in Cycle 5 (i.e., participants who were between 8 and 11 years old in Cycle 1, in 1994–1995). This represents about 5,000 adolescents. Of these, only those who participated in all cycles of data collection were selected. A total of 2,960 participants met this inclusion criterion, representing a retention rate of about 60% for an 8-year span. Of that number, 19 cases who reported sexual initiation before age 12 were excluded. Another 23 participants were excluded due to data inconsistencies. Finally, one child per household was selected at random to avoid within-family clustering. Thus, the final sample size is $N = 2,596$. The sample was evenly distributed across both genders and more than 90% of the participants were Whites. The remaining participants were composed mainly of First Nations children and children of Asian or African descent.

To take attrition into account as well as the stratified sampling of the NLSCY, all analyses were conducted using normalized longitudinal survey weights. The use of weights helps preserve the representativeness of the sample despite survey dropout, but it does not eliminate potential bias associated with partial nonresponse. Partial nonresponse occurs when participants fail to answer some of the survey questions. In this study, the rate of partial nonresponse varied between 0% and 7% for parent-reported variables and between 3% and 15% for self-reported variables (by design, some self-reported variables had a higher rate of missing data; for instance, those who were still virgins in Cycle 5—i.e., at 16–17/18–19 years old—were not asked about the age of first sexual partner). Multiple imputation was used to handle partial nonresponse (Allison, 2001). Multiple imputation is among the best methods currently available for reducing possi-

ble bias due to partial nonresponse, whereas taking into account imputation uncertainty. In this study, partial nonresponse was treated through the creation of five complete data sets obtained through multiple imputation (SAS MI procedure). Regression analyses were performed on each imputed data set separately, and the parameter estimates obtained in each set were recombined, resulting in a final, single set of estimates. The analyses were also repeated using simple listwise deletion of cases with missing data, and the main conclusions of the present study remained essentially unchanged.

Measures

Transitions to first sexual activity occurring during the first half of adolescence were considered (12–15 years old). Family (family structure, SES, and residential instability) and individual (behavior problems and pubertal development) predisposing factors were measured in late childhood (10–11 years old) and were thus antecedent to the outcome. Neighborhood poverty was measured concurrently during early adolescence (12–15 years old). Peer deviance was also measured concurrently, at 12–13 and 14–15 years old, whereas age at sexual intercourse and age of first sexual partner were measured retrospectively (16–17 or 18–19 years old). A summary of the measurement time points for each variable is provided in Table A1 in the Appendix.

Late Childhood Family and Individual Risk Factors

Family SES was measured through an index computed by Statistics Canada (Willms & Shields, 1996). Five standardized variables were combined to calculate family SES, including mothers' and fathers' educational attainment, mothers' and fathers' occupational prestige (classified according to the Standard Occupational Classification System), and household income. In this sample, the index ranged from -3.5 to 2.8 ($M = 0.0$, $SD = 0.8$). *Intact family status* represented those (73%) who lived with two biological or adoptive parents. *Residential instability during childhood* was also considered. The number of childhood relocations before the child reached age 10–11 varied from 0 to 15. This variable was recoded into a dichotomous variable contrasting those who had moved fewer than five times with those who had moved five times or more (11%).

Conduct problems were assessed with nine self-reported items representative of the three symptom domains listed in the *Diagnostic and Statistical Manual of Mental Disorders, 4th edition (DSM-IV)* for conduct

disorders, that is, physical aggression (bullying, fighting, attacking, kicking, or biting), destruction of property, deceitfulness or theft (vandalism and stealing), and serious violations of rules (running away, truancy, and staying out all night). Following the *DSM-IV* classification rules, those who reported that they had engaged in at least three of these behaviors in the past 12 months (13%) were considered at risk. *Early pubertal development* was measured with three gender-specific items pertaining to change in physical development markers: body hair, breast development and menstruation for adolescent females, and body hair, facial hair, and voice change for adolescent males. All questions were answered on a 4-point scale (0 = *no change yet* to 3 = *change completed*), except for menstruation, which was dichotomous. For items measured on a 4-point scale, responses were rescaled to range from 0 to 1. Then, total scores were computed and normalized by gender and age. Those with higher scores were more physically developed than their same-gender peers in late childhood.

Neighborhood Poverty

Links to the 2001 Canadian Census were made to assess the neighborhood poverty status associated with participants' main place of residence. The dissemination area (DA) was the geographic unit used to approximate the neighborhood environment. The DA has a population range of about 400–700 individuals (Puderer, 2001), which roughly corresponds to U.S. Census block groups. All DAs with 20% or more residents under Statistics Canada's low-income cutoff were considered as poor neighborhoods. About a quarter of participants resided in a poor neighborhood.

Peer Characteristics

Peer deviance was estimated with a single item asking the mother how often their child "hung around with kids who are frequently in trouble." Those who exhibited this behavior often or sometimes were considered at risk (12%). This single item was retained because unfortunately, other items measuring peer deviance were not consistent across data collection cycles. Participants who were sexually experienced were asked retrospectively about the *age of their first sexual partner*. For those who answered this question in more than one cycle, the first valid age reported was used. In virtually all instances, reported age of partners ranged between 12 and 25 years old. A dichotomous variable distinguishing those who had a first partner at least 3 years older than themselves at time of sexual initiation was created. As expected,

adolescent females were much more likely to have been sexually initiated with an older partner as compared to adolescent males, especially among younger adolescents. For instance, among adolescent females who became sexually initiated before 16 years old, 34% reported first intercourse with an older partner, whereas this rate dropped to 4% for adolescent males. These proportions are similar to those of other studies showing that around a third of sexually initiated adolescent females have a first sexual experience with a partner at least 3 years older, whereas this proportion is much lower among males (Manlove et al., 2007).

Outcome: Timing of First Consensual Sexual Intercourse

The observation window for the outcome covered the first half of adolescence (12–15 years old). The timing of entry into sexual activity was measured retrospectively by asking participants: "Have you ever had consensual sexual intercourse?" And, for those who answered positively: "How old were you when you first had consensual sexual intercourse?" For those who answered the question about age at sexual initiation in more than one cycle, the first valid age reported was used. Otherwise, the answer obtained in the last available wave of data collection was used (Cycle 5). It is important to note that sexual intercourse was not explicitly defined in the questionnaire. Thus, the measure is subject to interpretation bias and does not allow distinctions between sexual initiations occurring between same- and other-gender partners. The distribution of age at first intercourse was not significantly different for adolescent males and females, $\chi^2(4, N = 2,596) = 2.97, p = 0.56$, a result consistent with other recent studies using representative samples of Canadian adolescents (Hansen, Mann, McMahan, & Wong, 2004). As expected, the proportion of adolescents becoming sexually initiated increased steadily with age, from less than 2% at 12 years old to up to 15% at 15 years old. These proportions are consistent with those obtained in other representative samples of Canadian adolescents (Hansen et al., 2004; Maticka-Tyndale, McKay, & Barrett, 2001).

Results

Descriptive Statistics

Table 1 shows the distribution of the risk factors as a function of neighborhood poverty. Adolescents living in poor neighborhoods were more likely to come from low-SES, nonintact, and residentially

Table 1
 Descriptive Statistics as a Function of Neighborhood Context^a

	Nonpoor neighborhood (<i>n</i> = 1,948)			Poor neighborhood (<i>n</i> = 648)			χ^2/F
	%	<i>M</i>	<i>SD</i>	%	<i>M</i>	<i>SD</i>	
Late childhood risk factors							
Family socioeconomic status		0.14	0.74		-0.26	0.83	158.5***
Intact family	78.3			57.3			126.7***
Residentially unstable family	9.3			14.3			14.9***
Conduct problems	12.3			13.4			0.5
Pubertal development		-0.06	0.99		0.01	1.02	3.3 [†]
Peer characteristics (age in years)							
Deviant peers (12–13)	8.2			13.5			18.4***
Deviant peers (14–15)	12.6			16.1			5.9*
Older partner (12–13) ^b	34.1			46.2			2.3
Older partner (14–15) ^b	15.9			11.9			1.7
Transitions to sexual activity							
12 years old	1.3			3.5			14.9***
13 years old	2.9			4.9			6.8**
14 years old	6.8			7.9			1.1
15 years old	14.6			17.0			2.7

^aRounded data from first imputed data set (rounded down to closest lower integer for age at sexual initiation). ^bFor those who transitioned to first sexual activity at 12–13 or 14–15 years old.

[†] $p < .10$. * $p < .05$. ** $p < .01$. *** $p < .001$.

unstable families. However, no significant differences were found among the individual predisposing factors (conduct problems and pubertal development). Results also show that in poor neighborhoods, adolescents were more likely to affiliate with deviant peers. Finally, as expected, the age distribution for transitions to first sexual activity was significantly different in poor and more affluent neighborhoods, with significantly higher rates of transitions at 12 and 13 years old in poor neighborhoods.

Discrete-Time Hazard Models

To estimate the association between the risk factors and the timing of first sexual activity, discrete-time hazard models were used (Singer & Willett, 2003). This strategy is appropriate because the timing of first sexual activity was measured in terms of years, a discrete-time scale. Regular logistic regression routines can be used to estimate this type of model. In this case, the SAS LOGISTIC procedure estimated the regression coefficients separately in each of the five imputed data sets. Then, the MIANALYSE procedure recombined the results to obtain a final, single set of parameter estimates (Allison, 2001). Also, interactions between all risk factors and linear time were included. To test for these interactions, time was coded as a continuous variable ranging from 0 = 12 years old to 3 = 15 years old.

Bivariate Results

Table 2 shows results from bivariate discrete-time hazard models performed for adolescent females and males. For each gender, the first column presents the estimated odds ratio (OR) at 12 years old. For instance, the estimated OR associated with low family SES is 2.55 at 12 years old for adolescent females. This means that the odds of transitioning to sexual activity at 12 years old are about 2.5 times higher for adolescent females from low-SES families (i.e., with an SES score at least 1 *SD* below the national mean), compared with adolescent females from higher SES families. The second column contains the interaction effects with time, that is, the attenuating effect of every passing year. Continuing with the SES example, the first result in the second column for adolescent females indicates that the value of the OR associated with low SES diminishes by 24% ($1.00 - 0.76 = 0.24$) with every passing year. At 13 years old, the estimated OR becomes 1.94 ($2.55 \times 0.76 = 1.94$) and, finally, at 15 years old, it is 1.12 ($2.55 \times 0.76^3 = 1.12$). Thus, the effect of low family SES is strong in the early years of adolescence, but gradually fades away as adolescent females grow older, becoming negligible at 15 years old.

For adolescent females, the bivariate results show a significant effects for all the variables, except early pubertal development (although when the interaction

Table 2

Bivariate Discrete-Time Hazard Models Including Interaction Effects With Time: Estimated OR at 12 Years Old and OR Representing the Attenuating Effect of Time^a

	Adolescent females (<i>n</i> = 1,322)		Adolescent males (<i>n</i> = 1,274)	
	Initial OR (12 years old)	Time OR ^b	Initial OR (12 years old)	Time OR ^b
Late childhood risk factors				
Low family SES ^c	2.55***	0.76***	1.70***	0.91
Intact family	0.27***	1.32*	0.29***	1.17
Family residential instability	6.05***	0.62***	3.60***	0.71 [†]
Conduct problems	6.49***	0.55***	5.00***	0.60*
Pubertal development ^d	1.03	1.02	1.55*	0.87
Neighborhood context				
Neighborhood poverty	4.81***	0.55***	1.03	1.05
Peer characteristics				
Deviant peers	14.59***	0.64**	2.32	0.94
Older partner	28.50***	0.30***	10.49**	0.46

Note. OR = odds ratio; SES = socioeconomic status.

^aDummy markers of age were included, but associated intercepts are not shown. ^bORs in this column represent the interaction effects with time. For instance, the OR for family SES at 12 years old for adolescent females is 2.55. At 13 years old, it becomes 1.94 (2.55 × 0.76 = 1.94) and so on. ^cOne standard deviation below mean. ^dOne standard deviation above mean.

[†]*p* < .10. **p* < .05. ***p* < .01. ****p* < .001.

effect with time was excluded, the OR for this variable approached significance; OR = 1.09, 95% CI = 0.99 – 1.21). The ORs are especially large for affiliation to deviant peers and involvement with older partners. Low family SES, nonintact family status, and family residential instability, along with conduct problems and neighborhood poverty, were associated with higher risks of early sexual activity. Results also show that the effects of these risk factors were stronger in early adolescence and gradually faded as adolescent females grew older. The absence of significant effect for pubertal development is consistent with other NLSCY studies reporting no direct association between pubertal development measured at 10–11 years old and early sexual activity or other problem behavior in early adolescence among girls (Pepler & Sedighdeilami, 1998; Shapka, Dahinten, & Arim, 2006), although evidence suggests that when measured at later ages, this variable has a significant impact on the likelihood of being sexually experienced for both males and females (Garriguet, 2005). Thus, this result ought to be interpreted while keeping in mind the restrained variance of this variable at 10–11 years old (see Dorn, Susman, & Ponirakis, 2003; Udry & Billy, 1987, for a discussion of how the timing of measurement influence the estimated impact of pubertal development on adolescent behavior).

For adolescent males, the effects of the risks factors were generally smaller than for females, especially for peer characteristics. As opposed to females, family

and individual predispositions were more important determinants of adolescent males’ sexual behavior than peer processes. In this regard, the results are consistent with previous results showing that peers are more influential with respect to adolescent females’ sexual behavior (Billy & Udry, 1985). Also, the effect of the risk factors tended to be more evenly distributed across time. For adolescent males, only one significant interaction effect with time was found (conduct problems) along with one marginally significant interaction effect (residential instability).

Bivariate models including interaction effects with gender were also examined for the combined sample to determine whether the differences between adolescent males’ and females’ coefficients were statistically significant (results not shown). Significant or marginally significant interaction effects were found for SES (*B* = .50, *SE* = 0.28; *p* = .087), pubertal development (*B* = .41, *SE* = 0.20; *p* = .041), neighborhood poverty (*B* = –1.54, *SE* = 0.71; *p* = .055), and peer deviance (*B* = –1.84, *SE* = 0.60; *p* = .006).

Multivariate Results

Three multivariate models were estimated for adolescent males and females. They gradually incorporate the predictors, starting with the most distal ones. The first model includes late childhood individual and family control variables, along with neighborhood poverty. In the second model, interaction

terms between neighborhood disadvantage and predisposing individual and family risk factors are added. Only the interaction terms that were significant in preliminary analyses are included. In a final step, the more proximal peer processes were incorporated. This last step allows us to examine the potential mediating effect of peer processes. In all three models, interactions with time are included when appropriate.

Adolescent females. Table 3 presents the multivariate results for adolescent females. Model 1 shows that those living in poor neighborhoods were more likely to transition early, even after accounting for individual and family predisposing factors. The ORs were especially high in early adolescence and gradually faded as adolescent females grew older. For instance, at 12 years old, the odds of transitioning to first sexual activity were about 2.5 times higher in poor neighborhoods, but at 15 years old, the estimated ORs decreased to 0.74 ($2.46 \times 0.67^3 = 0.74$).

Model 2 reveals a significant interaction effect between neighborhood poverty and conduct problems and a marginally significant effect with residential instability. Because the OR associated with neighborhood poverty is no longer significant, adolescent females living in poor neighborhoods were more vulnerable *only* if they had a history of conduct problems and marginally so if they came from a res-

identially unstable family. To facilitate the interpretation of these interaction effects, Figure 1 presents the predicted probabilities of transition to first sexual activity as a function of age for various configurations of risk factors. The figure shows that among adolescent females residing in poor neighborhoods, only those with a history of conduct problems were more likely to transition early. The figure also confirms that the largest effects are found in early adolescence and gradually decline as adolescent females grow older. For instance, among adolescent females with conduct problems, the predicted hazard of transitioning to first intercourse, while holding other variables at their average values, is about 7.1 times higher in disadvantaged neighborhoods at 12 years old but only 1.2 times at 15 years old.

Finally, the last model in Table 3 shows that when the peer processes are included in the equation, the size of the interaction effects previously discussed is significantly reduced (e.g., the ORs are reduced by about 40% ($[6.69 - 3.78]/6.69$) for the interaction between neighborhood disadvantage and conduct problems) and the interaction terms become non-significant, thus indicating that peer characteristics partially accounted for the interaction effects found between individual and neighborhood risks. Also consistent with the proposed peer mediation model, Figure 2 illustrates that the peer risk factors are much

Table 3

Multivariate Discrete-Time Hazard Models Including Interaction Effects With Time for Adolescent Females: Estimated OR at 12 Years Old and OR Representing the Attenuating Effect of Time^a

	Model 1		Model 2		Model 3	
	Initial OR	Time OR	Initial OR	Time OR	Initial OR	Time OR
Late childhood risk factors						
Low SES ^b	1.71***	0.86**	1.51 [†]	0.93	1.32	0.96
Intact family	0.76	0.94	0.87	0.87	0.84	0.91
Residential instability	2.97**	0.76 [†]	1.38	1.00	0.84	1.14
Conduct problems	2.75**	0.73 [†]	1.07	1.00	0.88	0.93
Pubertal development ^c	1.06		1.06		1.09 [†]	
Neighborhood context						
Neighborhood poverty	2.46*	0.67**	1.63	0.74	2.18	0.68
Neighborhood Context × Childhood Risk ^d						
Neighborhood Poverty × Residential Instability			4.01 [†]	0.63	2.64	0.73
Neighborhood Poverty × Conduct Problems			6.69*	0.59	3.78	0.86
Peer characteristics						
Deviant peers					6.23***	0.87
Older partner					15.33***	0.35***

Note. OR = odds ratio; SES = socioeconomic status.

^aDummy markers of age were included, but associated intercepts are not shown. ^bOne standard deviation below mean. ^cOne standard deviation above mean. ^dInteraction effects between neighborhood poverty and SES and intact family status were included in Models 2 and 3, but these interactions were nonsignificant in the multivariate models; therefore, associated ORs are not shown.

[†] $p < .10$. * $p < .05$. ** $p < .01$. *** $p < .001$.

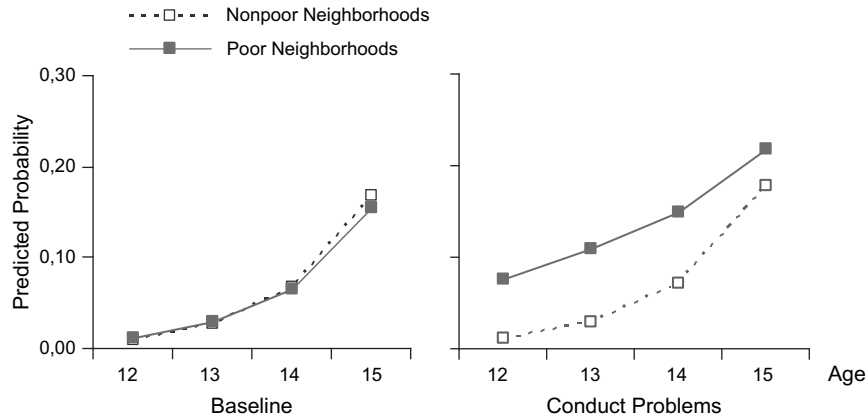


Figure 1. Adolescent females' predicted probabilities of transition to first sexual activity at baseline and among those with conduct problems in poor and nonpoor neighborhoods, as a function of age.

more prevalent for adolescent females with a history of conduct problems *and* who live in poor neighborhoods. For adolescent females in general, living in a poor neighborhood had little impact on peer characteristics.

Adolescent males. Table 4 presents the multivariate results for adolescent males. Consistent with the bivariate results, Model 1 shows that after controlling for preexisting family and individual risks, neighborhood disadvantage is not, on average, associated with accelerated transitions to first sexual activity. In contrast, nonintact family status, previous conduct problems, and early pubertal development all had independent, accelerating effects. Only one significant interaction effect with time emerged. This showed that the effect of previous conduct problems is stronger in younger adolescent males and attenuates as adolescent males grow older. Indeed, for those

with a history of conduct problems, the estimated odds were 4.1 times higher at 12 years old but only 1.1 times higher at 15 years old ($4.1 \times 0.64^3 = 1.1$).

In Model 2, significant interaction effects between late childhood risk factors and neighborhood poverty emerged for conduct problems and family SES. Figure 3 unpacks these effects. It plots adolescent males' estimated probabilities of transition to first sexual activity as a function of age for different configurations of risk factors. Figure 3 shows that the differences are smaller compared with the results for females (Figure 2). In Figure 3, the only curve that is clearly distinguishable from the others is the one representing the probabilities of transition for adolescent males living in a poor neighborhood and who had histories of conduct problems and who were from low-SES families. As shown in the figure, the predicted probability of transitioning to first intercourse, while holding other variables at their average values, is about 3 times higher in disadvantaged neighborhoods at 12 years old and 1.8 times higher at 13 years old for adolescent males who combined risks at the neighborhood, family, and individual levels.

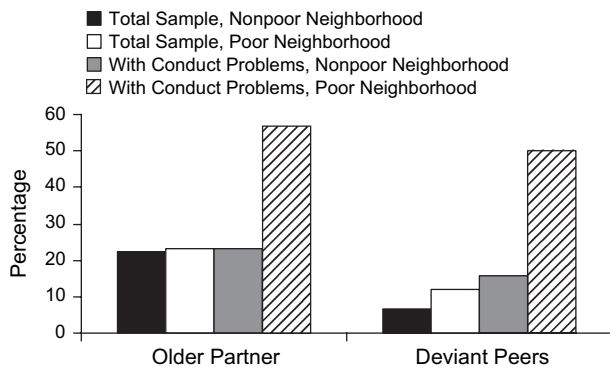


Figure 2. Adolescent females' peer characteristics as a function of neighborhood poverty status: Reported proportion of older partners (among those who transitioned to first sexual activity at 12 or 13 years old) and of deviant peers (at 12–13 years old) for adolescent females' total sample and among those with a history of conduct problems.

Model 3 examines whether these effects are attributable to the peer processes considered in this study. Results show that when the other variables are controlled, deviant peer affiliation and having an older partner are only marginally associated with early sexual activity and that these variables do not mediate the interaction effects discussed above. Indeed, the interaction effects remain significant or marginally significant and their magnitude is not significantly altered. In this final model for adolescent males, apart from the interaction effects discussed above, only the parameters associated with family structure and pubertal development remain significant.

Table 4

Multivariate Discrete-Time Hazard Models Including Interaction Effects With Time for Adolescent Males: Estimated OR at 12 Years Old and OR Representing the Attenuating Effect of Every Passing Year^a

	Model 1		Model 2		Model 3	
	Initial OR	Time OR	Initial OR	Time OR	Initial OR	Time OR
Late childhood risk factors						
Low SES ^b	1.47 [†]	0.92	1.18	1.04	1.12	1.03
Intact family	0.48**		0.46**		0.48**	
Residential instability	2.31 [†]	0.74	2.01	0.79	1.95	0.79
Conduct problems	4.10**	0.64*	2.59 [†]	0.76	2.53 [†]	0.76
Pubertal development ^c	1.52*	0.87	1.54*	0.87	1.51*	0.87
Neighborhood context						
Neighborhood poverty	0.79	1.08	0.24 [†]	1.70	0.25	1.67
Neighborhood Context × Childhood Risk						
Neighborhood Poverty × Low SES			2.63*	0.60**	2.63*	0.60**
Neighborhood Poverty × Conduct Problems			5.21*	0.56	4.71 [†]	0.57
Peer characteristics						
Deviant peers					1.51 [†]	
Older partner					2.16 [†]	

Note. OR = odds ratio; SES = socioeconomic status.

^aDummy markers of age were included, but associated intercepts are not shown. ^bOne standard deviation below mean. ^cOne standard deviation above mean.

[†] $p < .10$. * $p < .05$. ** $p < .01$.

Discussion

The goal of this study was to evaluate, within a developmental ecological framework, the link between the neighborhood poverty and the timing of first sexual activity in a sample of young adolescents. Results showed that ecological risk, namely, neighborhood disadvantage, was associated with early sexual initiation, but only for a subgroup of vulnerable adolescents. In contrast, the majority of young adolescents living in disadvantaged neighborhoods were not more likely to transition early. Importantly, neighbor-

hood effects depended upon adolescents' developmental stage, gender, and background characteristics. Thus, the moderation hypotheses were generally supported. Consistent with the proposed peer mediation model, results also suggested that peer characteristics partly explained the increased risk for vulnerable young adolescents living in disadvantaged neighborhoods. In short, the confluence of developmental and ecological vulnerability was found to increase the risk of engaging in early sexual activity and peer characteristics appeared to partly explain this risk.

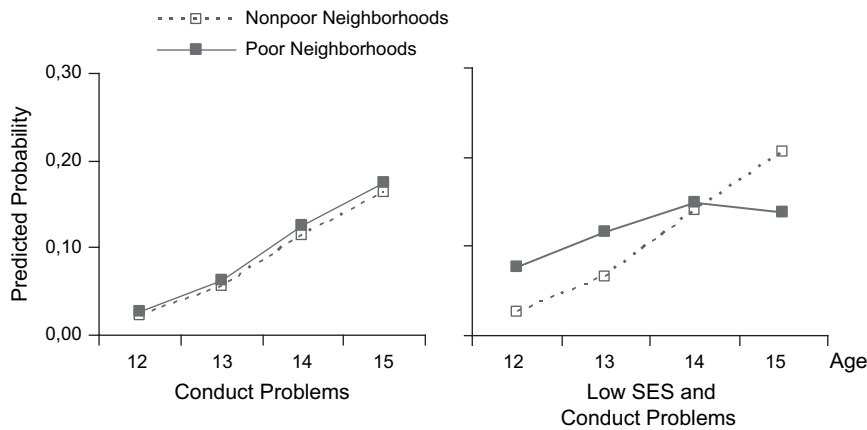


Figure 3. Adolescent males' predicted probabilities of transition to first sexual activity among those with conduct problems and among those with conduct problems and coming from a low-socioeconomic-status (SES) family, in poor and nonpoor neighborhoods, as a function of age.

For adolescent females, living in a poor neighborhood was associated with early initiation, but only for those who had a history of conduct problems. This effect was particularly strong in early adolescence, a time when sexual initiation is off-norm, and gradually faded as adolescent females progressed toward midadolescence, when it becomes more normative. Results suggested that adolescent females with conduct problems were especially at risk if they lived in poor neighborhoods possibly because in these contexts, they were more likely to affiliate with deviant, older males. In contrast, adolescent males living in poor neighborhoods were not, on average, more likely to experience early sexual initiation. However, results showed that if they had a history of conduct problems and were from a low-SES family, younger adolescent males living in poor neighborhoods were more vulnerable, as compared with adolescent males in more affluent neighborhoods with a similar profile. Among males, peer characteristics did not account for these interaction effects. Other mechanisms need to be considered in future research, such as the quality of neighborhood institutional resources or of parent-child relationships (Leventhal & Brooks-Gunn, 2000).

Consistent with Whitbeck et al.'s (1999) developmental model, many risk factors, including neighborhood disadvantage, had a stronger accelerating effect in early adolescence as compared with middle adolescence. The moderating impact of age is possibly due to the changing meaning of sexual activity across different developmental stages. Risk factors representing a departure from the norm, such as affiliation with deviant peers, predicted sexual initiation in younger adolescents, when this transition is clearly off-norms, but less so in older adolescents, when the transition becomes more normative. Interestingly, the moderating impact of age was generally stronger and more consistent among adolescent females than males, possibly because early sexual initiation represents a greater breach of social norms for them (Benda & DiBlasio, 1994). In addition to the changing meaning of sexual initiation as a function of age, other developmental processes might explain younger adolescents' increased sensitivity to neighborhood effects. For instance, as compared with older peers, younger adolescents are thought to be more susceptible to peer pressure and perceived social norms (Brooks-Gunn & Furstenberg, 1989).

In this study, neighborhood disadvantage had a direct, independent accelerating effect in adolescent females but not in males. This result is not wholly consistent with previous findings in the neighborhood literature. A study conducted with a sample of Black adolescents found an independent effect of

neighborhood disadvantage only in males (Ramirez-Valles et al., 2002). Another study conducted in a racially diverse sample found comparable neighborhood effects in both genders (Browning et al., 2005). In contrast, the present study, using a virtually all-White sample, found significant direct neighborhood effects only in adolescent females. Gender differences in neighborhood effects appear to depend on adolescents' racial and cultural background perhaps because gender-specific norms regarding the optimal timing for entry into sexual activity vary considerably across groups (East, 1998). Because cultural norms prohibiting early sexual activity tend to be especially emphasized for White adolescent females, early sexual activity represents a greater breach of norms for them compared with other racial groups (Cavanagh, 2004). This could explain why, in this sample, peer group characteristics marking an evident departure from the norm, such as peer deviance, were strongly associated with early sexual activity for adolescent females but not for males. This interpretation is also supported by previous studies showing that peer norms are powerfully associated with White adolescent females' sexual behavior, an association that appears specific to adolescent females from this racial group (Billy & Udry, 1985). Clearly, additional research is needed to uncover the mechanisms underlying gender differences in neighborhood effects within different racial and ethnic groups.

Among adolescent females, the impact of preexisting conduct problems was exacerbated in disadvantaged neighborhoods, apparently because these adolescent females were more at risk for affiliating with older, deviant males if they lived in a poor neighborhood. At least two explanations might account for this effect. First, adolescent females with such a background might seek the company of peers with a similar behavioral profile. In disadvantaged neighborhoods, this selection process is potentially facilitated given the higher prevalence of problem behaviors (Sampson et al., 2002). By seeking the company of similar peers, these adolescent females might often affiliate with older, deviant males because as a group, older adolescent males exhibit the highest level of delinquent behaviors (Hirschi & Gottfredson, 1983). Reciprocation could reinforce this process, with older deviant males likely to find younger adolescent females attractive (Caspi et al., 1993). In this social context, peer norms concerning the desirability of sexual activity, as well as developmental imbalances, are potentially responsible for the increased likelihood of sexual initiation. Second, family processes might also play an important role. For instance, adolescents with conduct problems are especially

impervious to parents' supervision efforts and inconsistent supervision is more strongly associated with early sexual initiation in disadvantaged neighborhoods (Browning et al., 2005). Thus, friendship preferences and family dynamics, in combination with an increased accessibility of deviant peers, might explain why in disadvantaged neighborhoods young adolescent females with a history of conduct problems are especially likely to engage in early sexual activity.

Finally, neighborhood poverty also amplified the effect of family disadvantage on early initiation. Adolescent males with a history of conduct problems and coming from a low-SES family were more likely to become sexually initiated in early adolescence, but only if they also lived in a poor neighborhood, and among adolescent females, those living in a poor neighborhood and originating from a residentially unstable family were marginally more at risk. Different mechanisms, in addition to the supervision pathway discussed above, may explain why the negative impact of family disadvantage appears reinforced in poor neighborhoods. First, adolescents from a disadvantaged family background may be more likely to develop a sense of hopelessness when their families' difficulties are echoed in their larger environment (Wilson, 1987). In turn, "nothing to lose" attitudes are associated with adolescent involvement in risk behaviors (Harris, Duncan, & Boisjoly, 2002). Also, residential instability may further reduce access to the already scarce social and institutional resources in disadvantaged neighborhoods. Notably, residential instability has a negative impact on the quality of adolescents' friendship networks. Indeed, adolescents who have recently moved to a new neighborhood have been found to be more likely to affiliate with deviant friends, which in turn increases the risk for early sexual activity (South et al., 2005).

The conclusions of this study should be considered with some important limitations in mind. First, even if special care has been devoted to circumvent possible bias due to attrition, limits to generalizability may remain. In particular, as noted above, the results might apply only to the cultural group studied. Second, even if important family and individual confounding factors were taken into account, the possibility of selection bias can never be fully ruled out. Indeed, there is always a chance that an omitted variable associated with both neighborhood poverty and sexual initiation is responsible for neighborhood effects. Third, as is often the case in large-scale studies investigating many aspects of development, some of the concepts investigated would have benefited from more thorough measurement strategies. For instance, in addition to retrospective information about the age

of first sexual partners, prospective information about the age of boyfriends and girlfriends would have strengthened our results and refined our interpretations. In the same vein, additional details about the circumstances of first intercourse, such as the degree of consent, would have allowed us to make additional distinctions. Fourth, the survey questions did not allow distinctions between sexual initiations with same- and other-gender partners. For this reason, the explanatory model proposed, which is centered on other-gender sexual activity, misrepresents the experiences of adolescents engaging in same-gender sexual activities. In addition, even if the sample in this study is large, the main conclusions are based on relatively small numbers of individuals. Indeed, because the NLSCY is a normative sample, early intercourse was relatively rare. Replications of findings in other studies oversampling at-risk adolescents are warranted. Also, although results from prediction models are robust, point estimates of the proportion of sexually experienced adolescents at different ages can vary appreciably depending on how missing data and data inconsistencies are treated and for this reason should be viewed with caution (Upchurch, Lillard, Aneshensel, & Fang Li, 2002). Finally, because adolescent males are more likely than adolescent females to provide inconsistent reports of age at sexual initiation (Upchurch et al., 2002), some of the differing results observed for adolescent males and adolescent females might reflect this tendency. Notably, it might contribute to the lack of significant predictors of adolescent males' sexual behavior.

Another important limitation of the study is the uncertainty regarding the temporal order of the peer explanatory variables. It was suggested that adolescent females with conduct problems were more likely to affiliate with older, deviant males during early adolescence and that this tendency in turn placed them at risk for early sexual activity. However, because the peer processes were measured concurrently, it is equally possible that adolescent females were introduced into deviant peer groups through early sexual debut. Thus, because of the correlational nature of this study and because of the uncertain temporal order of the explanatory processes, causation cannot be directly inferred. More detailed interview data would be necessary to grasp the temporal ordering of the events leading to early sexual activity in various contexts.

This study used a developmentally oriented framework for examining the link between the neighborhood disadvantage and the timing of sexual initiation. In line with previous studies showing that the association between neighborhood disadvantage and early sexual activity depends on family characteristics

(Browning et al., 2005), this study further demonstrated that this association also depends on individual characteristics such as age and behavioral traits. By identifying young adolescents who are particularly at risk within disadvantaged communities, this study provides valuable insights for future intervention efforts. The results suggest that to maximize effectiveness, prevention programs need to take the larger social context into account and make special efforts to enroll vulnerable young adolescents. Also, the results suggest that additional research is needed that examine the role of neighborhood peers, a potentially important explanatory factor for neighborhood effects on adolescent sexual behavior. If future research confirms a causal role, prevention programs aimed at delaying first sexual activity could benefit from integrating strategies for reducing affiliation with deviant neighborhood peers.

References

- Albert, B., Brown, S., & Flanigan, C. (Eds.). (2003). *14 and younger: The sexual behavior of young adolescents (Summary)*. Washington, DC: National Campaign to Prevent Teen Pregnancy.
- Allison, P. D. (2001). *Missing data*. Thousand Oaks, CA: Sage.
- Baumer, E. P., & South, S. J. (2001). Community effects on youth sexual activity. *Journal of Marriage and Family, 63*, 540–554.
- Benda, B. B., & DiBlasio, F. A. (1994). An integration of theory: Adolescent sexual contacts. *Journal of Youth and Adolescence, 23*, 403–420.
- Billy, J. O. G., & Udry, J. R. (1985). The influence of male and female best friends on adolescent sexual behavior. *Adolescence, 20*, 21–32.
- Brody, G. H., Ge, X., Conger, R. D., Gibbons, F. X., Murry, V. M., Gerrard, M., et al. (2001). The influence of neighborhood disadvantage, collective socialization, and parenting on African American children's affiliation with deviant peers. *Child Development, 72*, 1231–1246.
- Bronfenbrenner, U. (1979). *The ecology of human development*. Cambridge, MA: Harvard University Press.
- Brooks-Gunn, J., & Furstenberg, F. F. (1989). Adolescent sexual behavior. *American Psychologist, 44*, 249–257.
- Browning, C. R., Leventhal, T., & Brooks-Gunn, J. (2004). Neighborhood context and racial differences in early adolescent sexual activity. *Demography, 41*, 697–720.
- Browning, C. R., Leventhal, T., & Brooks-Gunn, J. (2005). Sexual initiation in early adolescence: The nexus of parental and community control. *American Sociological Review, 70*, 758–778.
- Caspi, A., Lynam, D. R., Moffitt, T. E., & Silva, P. A. (1993). Unraveling girls' delinquency: Biological, dispositional, and contextual contributions to adolescent misbehavior. *Developmental Psychology, 29*, 19–30.
- Cavanagh, S. E. (2004). The sexual debut of girls in early adolescence: The intersection of race, pubertal timing, and friendship group characteristics. *Journal of Research on Adolescence, 14*, 285–312.
- Darroch, J. E., Frost, J. J., Singh, S., & Study Team. (2001). *Teenage sexual and reproductive behavior in developed countries: Can more progress be made?* Occasional Report, The Alan Guttmacher Institute, New York.
- Dickson, N., Paul, C., Herbison, P., & Silva, P. (1998). First sexual intercourse: Age, coercion, and later regrets reported by a birth cohort. *British Medical Journal, 316*, 29–33.
- Dorn, L. D., Susman, E. J., & Ponirakis, A. (2003). Pubertal timing and adolescent adjustment and behavior: Conclusions vary by rater. *Journal of Youth and Adolescence, 32*, 157–167.
- East, P. L. (1998). Racial and ethnic differences in girls' sexual, marital, and birth expectations. *Journal of Marriage and the Family, 60*, 150–162.
- French, D. C., & Dishion, T. J. (2003). Predictors of early initiation of sexual intercourse among high-risk adolescents. *Journal of Early Adolescence, 23*, 295–315.
- Garriguet, D. (2005). Early sexual intercourse. *Health Reports (Statistics Canada, Catalogue 82-003), 16*, 9–18.
- Graber, J. A., Brooks-Gunn, J., & Galen, B. R. (1998). Betwixt and between: Sexuality in the context of adolescent transitions. In R. Jessor (Ed.), *New perspectives on adolescent risk behavior* (pp. 270–316). Cambridge, UK: Cambridge University Press.
- Halpern, C. T., Kaestle, C. E., & Hallfors, D. D. (2007). Perceived physical maturity, age of romantic partner, and adolescent risk behavior. *Prevention Science, 8*, 1–10.
- Hansen, L., Mann, J., McMahon, S., & Wong, T. (2004). Sexual health. *BMC Women's Health, 4*(Suppl. 1), S24–S32.
- Harding, D. J. (2007). Cultural context, sexual behavior, and romantic relationships in disadvantaged neighborhoods. *American Sociological Review, 72*, 341–364.
- Harris, K. M., Duncan, G. J., & Boisjoly, J. (2002). Evaluating the role of "nothing to lose" attitudes on risky behavior in adolescence. *Social Forces, 80*(3), 1005–1039.
- Hirschi, T., & Gottfredson, M. (1994). Age and the explanation of crime. *American Journal of Sociology, 89*, 552–584.
- Ingoldsby, E. M., Shaw, D. S., Winslow, E., Schonberg, M., Gilliom, M., & Criss, M. M. (2006). Neighborhood disadvantage, parent-child conflict, neighborhood peer relationships, and early antisocial behavior problem trajectories. *Journal of Abnormal Child Psychology, 34*, 293–319.
- Kaestle, C. E., Halpern, C. T., Miller, W. C., & Ford, C. A. (2005). Young age at first intercourse and sexually transmitted infections in adolescents and young adults. *American Journal of Epidemiology, 161*, 774–780.
- Leventhal, T., & Brooks-Gunn, J. (2000). The neighborhoods they live in: The effects of neighborhood residence in child and adolescent outcomes. *Psychological Bulletin, 126*, 309–337.
- Manlove, J., Ryan, S., & Franzetta, K. (2007). Risk and protective factors associated with the transition to a first

- sexual relationship with an older partner. *Journal of Adolescent Health*, 40, 135–143.
- Marin, B. V., Coyle, K. K., Gomez, C. A., Carvajal, S. C., & Kirby, D. B. (2000). Older boyfriends and girlfriends increase risk of sexual initiation in young adolescents. *Journal of Adolescent Health*, 27, 409–418.
- Maticka-Tyndale, E., McKay, A., & Barrett, M. (2001). *Teenage sexual and reproductive behavior in developed countries: Country report for Canada*. New York: The Alan Guttmacher Institute.
- Obeidallah, D., Brennan, R. T., Brooks-Gunn, J., & Earls, F. (2004). Links between pubertal timing and neighborhood contexts: Implications for girls' violent behavior. *Journal of the Academy of Child and Adolescent Psychiatry*, 43, 1460–1468.
- Pepler, D. J., & Sedighdeilami, F. (1998). *Aggressive girls in Canada*. Ottawa, Ontario, Canada: Human Resources Development Canada, Applied Research Branch.
- Puderer, H. (2001). Introducing the dissemination area for the 2001 census: An update. In *Geography Working Paper Series* (Vol. 2000–2004). Ottawa, Canada: Statistics Canada.
- Ramirez-Valles, J., Zimmerman, M. A., & Juarez, L. (2002). Gender differences of neighborhood and social control process: A study of the timing of first intercourse among low-achieving, urban, African American youth. *Youth and Society*, 33, 418–441.
- Sampson, R. J., Morenoff, J. D., & Gannon-Rowley, T. (2002). Assessing “neighborhood effects”: Social processes and new directions in research. *Annual Review of Sociology*, 28, 442–478.
- Shapka, J. D., Dahinten, V. S., & Arim, R. G. (2006). *Adolescent early sexual activity: An examination of risk and protective factors*. Paper presented at the European Association for Research on Adolescence, Antalya, Turkey.
- Simons, R. L., Johnson, C., Beaman, J., Conger, R. D., & Whitbeck, L. B. (1996). Parents and peer group as mediators of the effect of community structure on adolescent problem behavior. *American Journal of Community Psychology*, 24, 145–171.
- Singer, J. D., & Willett, J. B. (2003). *Applied longitudinal data analysis: Modeling change and event occurrence*. Oxford, UK: Oxford University Press.
- South, S. J., Haynie, D. L., & Bose, S. (2005). Residential mobility and the onset of adolescent sexual activity. *Journal of Marriage and Family*, 67, 499–514.
- Statistics Canada. (2005). *National Longitudinal Survey of Children and Youth microdata user guide—Cycle 5*. Ottawa, Canada.
- Udry, J. R., & Billy, J. O. G. (1987). Initiation of coitus in early adolescence. *American Sociological Review*, 52, 841–855.
- Upchurch, D. M., Aneshensel, C. S., Sucoff, C. A., & Levy-Storms, L. (1999). Neighborhood and family contexts of adolescent sexual activity. *Journal of Marriage and the Family*, 61, 920.
- Upchurch, D. M., Lillard, L. A., Aneshensel, C. S., & Fang Li, N. (2002). Inconsistencies in reporting the occurrence and timing of first intercourse among adolescents. *Journal of Sex Research*, 197–206.
- Whitbeck, L. B., Yoder, K. A., Hoyt, D. R., & Conger, R. D. (1999). Early adolescent sexual activity: A developmental study. *Journal of Marriage and Family*, 61, 934–946.
- Willms, J. D., & Shields, M. (1996). *A measure of socioeconomic status for the National Longitudinal Study of Children*. Fredericton: Canadian Research Institute for Social Policy.
- Wilson, W. J. (1987). *The truly disadvantaged: The inner city, the underclass, and public policy*. Chicago: University of Chicago Press.

Appendix

Table A1
Design Characteristics: Timing of Measurement and Informant

	Timing of measurement		
	Type	Age (years)	Informant
Socioeconomic status	Antecedent	10–11	Parent
Intact family status	Antecedent	10–11	Parent
Family residential instability	Antecedent	10–11	Parent
Conduct problems	Antecedent	10–11	Self
Pubertal development	Antecedent	10–11	Self
Neighborhood poverty	Concurrent	12–13 or 14–15	Census
Deviant peers	Concurrent	12–13 or 14–15	Parent
Older partner	Retrospective	16–17 or 18–19	Self
Age at first consensual intercourse	Retrospective	16–17 or 18–19	Self