# Chapter 16
# Understanding Early Initiation of Sexual Intercourse in Adolescence

**Frances M. Costa, Richard Jessor, John E. Donovan, and J. Dennis Fortenberry**

Early sexual activity can have significant personal, social, and economic consequences for adolescents in this country. Teenage pregnancy often disrupts the course of adolescents' lives by limiting educational and employment aspirations, opportunities, and achievements (Hayes, 1987). The rising incidence of HIV infection and other sexually transmitted diseases adds to the risk of early sexual behavior (Cates, 1991).

This study examined the relationship of psychosocial unconventionality to earliness of transition to nonvirginity among contemporary urban adolescents. Psychosocial unconventionality implies a rejection of societal norms and values and a proneness to engaging in nonconforming behavior. It is a key construct of Problem Behavior Theory (R. Jessor, Donovan, & Costa, 1991; R. Jessor & S. L. Jessor, 1977), which is concerned with the explanation of transgression of social norms, especially in adolescence. The variables included in the theoretical framework have to do with the tendency to depart from the conventional norms of adult society; they are presumed to reflect an underlying dimension that summarizes this commonality and is termed *unconventionality* (see Donovan & R. Jessor, 1985; R. Jessor, 1984; R. Jessor et al., 1991; R. Jessor & S. L. Jessor, 1978).

Problem Behavior Theory specifies three interrelated domains of influence: the *personality system,* the *perceived environment system,* and the *behavior system.* The likelihood of engaging in problem behavior depends on personality characteristics, social environmental factors, and other behaviors that reflect greater or lesser orientation toward, attachment to, and involvement with conventional values, goals, and institutions. Greater orientation toward and attachment to conventional society

Reprinted with permission from:
Costa, F. M., Jessor, R., Donovan, J. E., & Fortenberry, J. D. (1995). Early initiation of sexual intercourse: The influence of psychosocial unconventionality. *Journal of Research on Adolescence, 5*(1), 93–121.

F.M. Costa • R. Jessor, Ph.D., Sc.D. (✉) • J.E. Donovan • J.D. Fortenberry
Institute of Behavioral Science, University of Colorado Boulder, Boulder, CO 80309, USA
e-mail: jessor@Colorado.edu



R. Jessor, *Problem Behavior Theory and Adolescent Health*, Advancing Responsible Adolescent Development, DOI 10.1007/978-3-319-51349-2_16

(i.e., greater conventionality) indicate a lower likelihood of becoming involved in problem behavior; detachment from conventional institutions and rejection of conventional goals and values (i.e., greater unconventionality) indicate a greater likelihood of problem behavior involvement. In this theoretical formulation, behavior is considered to be an outcome of the interaction or joint influence of personality and environment; neither the person nor the situation is assigned causal priority. In this respect, Problem Behavior Theory represents a social-psychological field theory (see R. Jessor & S. L. Jessor, 1977, for a full description of the conceptual framework of Problem Behavior Theory and the rationale for each of the variables in the theory reflecting unconventionality or proneness to normative departure).

Early or precocious sexual intercourse is considered problem behavior in adolescence, that is, behavior that departs from the regulatory norms of conventional society defining appropriate behavior for that age or stage in life. Previous applications of Problem Behavior Theory have provided a significant account of early transition to nonvirginity (R. Jessor, Costa, L. Jessor, & Donovan, 1983; R. Jessor & S. L. Jessor, 1977; S. L. Jessor & R. Jessor, 1975). The antecedents of first intercourse in adolescence were shown to consist of a theoretically coherent pattern reflecting psychosocial and behavioral unconventionality. Discriminating factors included personality characteristics, such as low expectations for academic achievement and high tolerance of deviance; perceived environment factors, such as low compatibility between parents and friends and more models among friends for problem behavior; and behaviors, such as low school achievement and high involvement in the use of illicit drugs.

These earlier findings were based on a relatively homogeneous sample of middle-class, White adolescents tested in the late 1960s and early 1970s, and their generality for other groups of young people and for contemporary American society is unclear. Important historical changes have occurred since then in social norms concerning sexuality. A re-examination of the role of psychosocial and behavioral unconventionality in the context of the current normative environment and in a more diverse sample of contemporary youths seemed warranted.

Early sexual activity has been linked to a wide range of sociodemographic characteristics, including race/ethnicity (e.g., Aneshensel, Becerra, Fielder, & Schuler, 1990; Zelnik, Kantner, & Ford, 1981), socioeconomic status (Furstenberg, Morgan, Moore, & Peterson, 1987; Hogan & Kitagawa, 1985), and family composition (Hogan & Kitagawa, 1985; Zelnik et al., 1981). The relation of early sexual activity to one or another aspect of unconventionality has also been established, including lower religiosity (Thornton & Cambum, 1989), lower levels of academic involvement and achievement (Miller & Sneesby, 1988), and involvement in other problem behaviors, such as cigarette smoking, drinking, and use of illicit drugs (Alexander et al., 1989; Elliott & Morse, 1989; Ketterlinus, Lamb, & Nitz, 1991; Rosenbaum & Kandel, 1990). These more recent studies, however, have important limitations, including reliance on retrospective reports or on indirect indicators of the time of first intercourse, investigation of only cross-sectional rather than longitudinal relations between unconventionality and early sexual activity, and examination of only a few selected indicators of unconventionality (Alexander et al., 1989; Elliott & Morse, 1989; Miller & Sneesby, 1988; Rosenbaum & Kandel, 1990).

This study examined the linkage of patterned unconventionality to the earliness of transition to nonvirginity. The present study extends earlier work by engaging the contemporary social context and by including White, Hispanic, and African-American adolescents from socioeconomically diverse backgrounds.

## Method

### *Study Design and Procedures*

Four waves of data were collected: spring of 1989, 1990, 1991, and 1992. At Wave 1, participants were in Grades 7 through 9 in six middle schools and four high schools in a large, metropolitan school district in the Rocky Mountain region. Schools were assigned to the study by school district officials to maximize representation of Hispanic and African-American students from inner-city areas.

Active parental and personal consent was sought for all students enrolled in the selected schools. Letters describing the study and consent forms were written in both English and Spanish.

Study participants were released from class to take part in large group questionnaire administration sessions proctored by members of the research staff. At the Wave-2, Wave-3, and Wave-4 follow-up times, questionnaires were also mailed to students no longer enrolled in the school district or otherwise unavailable for in-school testing. Bilingual versions of the questionnaire were available for students who preferred to work in Spanish. Each participating student received a token payment of $5.

### *Participants*

A total of 2,410 students participated in Wave 1 of the study in 1989. Questionnaires were filled out by 67% of the middle-school students (Grades 7 and 8) and by 49% of the high-school students (Grade 9) in Wave 1. At Wave 2 (1990), questionnaires were completed by 2,016 students (84% of the Wave-1 sample). In Wave 3 (1991), 1,974 students (82% of the Wave-1 sample) completed questionnaires, and in Wave 4, 1,782 students (74% of the Wave-1 sample) took part. Overall, 1,591 students (66% of the Wave-1 sample) filled out all four annual questionnaires.

Forty-three percent of the 4-wave longitudinal sample was male. Equal proportions of the sample were in the seventh-, eighth-, and ninth-grade cohorts. With respect to race/ethnicity, 36% of the sample was White, 36% was Hispanic, 22% was African American, 4% was Asian, and 2% was Native American. With respect to socioeconomic background, 26% of participants' fathers had not graduated from high school, 20% of fathers were high school graduates, and 54% had some education beyond high school. About one third of participants' fathers were employed in unskilled jobs; one third, in skilled or clerical jobs; and one third, in managerial or

professional jobs. Forty-five percent of the participants were from intact families, 22% had a stepparent living with them (usually stepfather), 29% lived with a single parent (usually mother), and 3% lived with other relatives or guardians.

## *Sample Loss*

*Initial Nonparticipation.* Although the initial response rate was lower than desired, analyses suggested that initial losses did not threaten the validity of the research findings. Comparisons of the 2,410 Wave-1 participants with the 2,022 nonparticipants on data from school records revealed that nonparticipants had lower grades, lower achievement test scores, more disciplinary actions, and more absences from school. Although the group means were significantly different, both extremes of the full range of scores on these measures in the total population were also found in the participant sample.

*Subsequent Attrition.* The effects of attrition subsequent to Wave 1 on the integrity of the participating sample were also examined. The 1,591 four-wave longitudinal participants were slightly but significantly younger than participants lost to attrition (13.6 vs. 13.9 years old in Wave 1), higher in socioeconomic status, more likely to live with both natural parents, and more likely to be White and less likely to be Hispanic. (The 819 non-four-wave participants included participants having only one ($N$ = 212), two ($N$ = 215), or three ($N$ = 392) waves of data.) Comparisons of mean scores on 12 different measures of psychosocial and behavioral unconventionality showed that the four-wave longitudinal participants were more conventional than the nonlongitudinal participants, as indicated by significant mean differences in the expected direction on 9 of the 12 measures. The actual size of the mean differences, however, was insubstantial in four of these nine instances. More importantly, when the intercorrelations of the variables within the two samples were examined, there was no evidence of bias in the relationships among the measures of unconventionality.[1]

The fact that attrition after Wave 1 involved somewhat less conventional students means that the data should have yielded more conservative estimates of the relation between unconventionality and initiation of sexual intercourse.

*Sample Loss Due to Incomplete Data.* A small number ($N$ = 171) of four-wave participants were omitted from the analyses because they made incomplete,

[1] A test of the equality of the covariance structure matrices in the two groups, based on nine representative variables, resulted in a goodness of fit index of .997, indicating a high degree of similarity between the two matrices. Although the associated chi-square statistic for lack of fit was 79.8 with 36 degrees of freedom, which is significant, this chi-square was small considering the sample sizes and the number of variables involved and indicates no serious degree of difference in the covariance structures for the four-wave participants versus the non-four-wave participants. In other words, the pattern and magnitude of relationships among the predictor variables were essentially equivalent in the two groups.

inconsistent, or frivolous responses to questions about their sexual intercourse experience: Twenty-three were missing data on sexual intercourse experience; 21 reported age at first intercourse as 10 years old or younger; 13 made frivolous responses to the questions about sexual behavior; 63 gave contradictory reports about intercourse experience from year to year; and, for 51, incomplete or inconsistent reports made it difficult to determine confidently the year in which first intercourse occurred. These omitted participants accounted for 7% or less of the White, Hispanic, and African-American female four-wave participants, for about 15% of the White and Hispanic male four-wave participants, and for fully one third of the African-American male longitudinal participants.

Despite the initial nonparticipation, the subsequent attrition, and the omission of subjects having incomplete or inconsistent data on sexual intercourse, the full range of variation on the key measures in the analyses was retained in the participating four-wave sample.[2]

## *Measurement of Sexual Behavior*

Virgin/nonvirgin status and time of first intercourse were established on the basis of participants' responses in each year of the study to two questions: "Have *you* ever had sexual intercourse ('gone all the way') with someone of the opposite sex?" and "How old were you the *first* time you had sexual intercourse?" There were 1,330 White, Hispanic, and African-American participants whose reports were consistent across their four waves of data collection: 295 White girls, 228 White boys, 313 Hispanic girls, 198 Hispanic boys, 207 African-American girls, and 89 African-American boys. (Due to the small numbers in the other racial/ethnic groups, Asian-American and Native-American and adolescents were not included in the analyses.) Not only was the African-American sample the smallest of the three groups, but, as was noted earlier, a relatively large proportion of African-American boys were omitted from the analyses because they provided incomplete or inconsistent data about their sexual intercourse experience.

Variation in sexual experience in this sample is shown in Table 16.1. Comparable with data reported by others, greater proportions of boys than girls reported having had sexual intercourse, and greater proportions of African Americans and Hispanics than Whites had had intercourse. Girls reported being significantly older than boys at first intercourse (14.8 vs. 14.2 years old), and African-American boys and girls reported initiating sexual intercourse at a significantly younger age than Whites and Hispanics (controlling for socioeconomic status).

[2] For reference, a table of unadjusted means, standard deviations, and ranges on the measures used in this paper is presented in the Appendix for the following three groups: four-wave participants used in the analyses; four-wave participants omitted from analyses due to incomplete, inconsistent, or untrustworthy responses to questions about sexual behavior; and Wave-1 participants lost to subsequent attrition.

**Table 16.1** Percentage of Sexually Experienced Adolescents in Each Wave by Race/Ethnicity and Gender

| Gender/Wave | Wave 1 (1989) | Wave 2 (1990) | Wave 3 (1991) | Wave 4 (1992) |
|---|---|---|---|---|
| *Girls* | | | | |
| White[a] | 12 | 23 | 37 | 54 |
| Hispanic[b] | 15 | 35 | 52 | 66 |
| African-American[c] | 26 | 48 | 59 | 72 |
| Total[d] | 17 | 34 | 49 | 63 |
| *Boys* | | | | |
| White[e] | 16 | 27 | 44 | 58 |
| Hispanic[f] | 40 | 58 | 72 | 81 |
| African-American[g] | 51 | 61 | 73 | 80 |
| Total[h] | 32 | 45 | 60 | 71 |

[a] $n = 295$
[b] $n = 313$
[c] $n = 207$
[d] $n = 815$
[e] $n = 228$
[f] $n = 198$
[g] $n = 89$
[h] $n = 515$

In their consistency with recent national sample data[3] and with the findings of other investigators (Alexander et al., 1989; Furstenberg et al., 1987; Ketterlinus et al., 1991; Rosenbaum & Kandel, 1990; Sonenstein, Pleck, & Ku, 1991; Torres & Singh, 1986), the Table 16.1 data provide additional support for the representativeness of the four-wave participant sample and for the validity of the measures of sexual experience used in this study.

## *Measurement of Psychosocial and Behavioral Unconventionality*

The annual questionnaire included a wide range of measures of unconventionality drawn from the three systems of Problem Behavior Theory. A thorough description of these variables, their theoretical significance, their measurement, and the rationale for using each of the measures as an indicator of proneness toward normative transgression was presented elsewhere (R. Jessor et al., 1991; R. Jessor & S. L. Jessor, 1977).

[3] The levels of sexual experience reported in this sample are comparable to levels based on national sample data (Centers for Disease Control, 1992) collected in 1990. For example, in the 1990 national sample, 53% of 10th-grade boys and 43% of 10th-grade girls (Whites, Hispanics, and African Americans combined) in the United States reported having had intercourse, compared with 53% and 46% of the Wave-2 (1990) 10th-grade boys and girls, respectively, in the present sample.

Three measures of unconventionality were taken from the personality system of Problem Behavior Theory. Greater personality unconventionality is indicated by higher value placed on independence relative to achievement, by lower expectations for academic achievement, and by higher tolerance of deviance.

*Independence-Achievement Value Discrepancy.* This measure is a derived index that reflects the degree to which value on independence (a 4-item scale; $\alpha = .67$) is greater than value on academic achievement (a 4-item scale; $\alpha = .74$). Placing a higher value on the goal of independence than on the goal of academic achievement implies a lower likelihood of engagement with and of action directed toward the conventionally sanctioned goal of doing well in school and a greater orientation away from conventionality and from adult regulation and control.

*Expectation for Achievement.* This 4-item scale assesses expectations for success in the area of academic achievement ($\alpha = .85$). Having lower expectations for academic achievement may imply a detachment from the conventional institution of school.

*Attitudinal Tolerance of Deviance.* This 10-item scale assesses the rated "wrongness" of various normative transgressions, such as theft, physical aggression, and lying ($\alpha = .90$). Greater tolerance of departures from normatively approved behaviors has a fairly obvious connection to unconventionality.

Four measures were taken from the perceived environment system of Problem Behavior Theory. Greater perceived environment unconventionality is indicated by less compatibility between parents and friends, by greater influence of friends relative to parents, by lower parental disapproval of problem behavior, and by relatively more friends who model problem behavior.

*Parent-Friends Incompatibility.* This measure is a 3-item scale of perceived agreement between parents and friends regarding what is important in life, the kind of person the respondent should become, and what the respondent should be getting out of being in school ($\alpha = .72$). Because parents' outlooks and expectations can be expected to be more conventional, greater incompatibility between parents and peers implies a greater degree of unconventionality in the peer context and, therefore, exposure to more unconventional attitudes and expectations and to challenges of the legitimacy of and the controls exercised by parents and other adult authorities.

*Parent-Friends Influence.* This 3-item scale assesses the relative influence of parents and friends on the respondent's outlook on life and on his or her choices and behavior ($\alpha = .58$). Because parental influence is expected to be more conventional, greater orientation to friends than to parents indicates that the adolescent is exposed to and oriented toward more unconventional standards and socialization influences.

*Parental Disapproval-Approval of Problem Behavior.* This 2-item scale assesses perceived parental attitudes toward adolescent use of alcohol and marijuana ($\alpha = .56$). The perception of low parental disapproval of adolescent problem behavior implies a more unconventional orientation in the parental context.

*Friends as Models for Problem Behavior.* This measure is a 3-item scale assessing the respondent's perception of the prevalence of models for nonnormative or illegal

behavior. It includes friends who smoke cigarettes, who use alcohol, or who use marijuana (e.g., "How many of your friends drink alcohol fairly regularly?"; response options ranged from *none* (1) to *all of them* (4); $\alpha = .76$). Higher prevalence of models for engaging in problem behavior indicates a more unconventional social context.

Three measures of problem behavior and two of conventional behavior were taken from the behavior system of Problem Behavior Theory. Behavioral unconventionality is indicated by higher levels of involvement in problem behaviors and lower involvement in conventional behavior.

*Deviant Behavior.* This 10-item scale assesses frequency of engagement in various delinquent-type behaviors in the past 6 months, including physical aggression, property destruction, theft, and lying ($\alpha = .83$).

*Problem Drinking.* This measure is a 3-component scale assessing frequency of drunkenness in the past 6 months, frequency of high-volume drinking (five or more drinks per occasion) in the past 6 months, and negative consequences of drinking (including frequency of trouble with parents, at school or with schoolwork, with friends, with dates, and with the police; $\alpha = .83$).

*Marijuana Behavior Involvement.* This 4-item scale assesses extent of involvement in marijuana use, including whether the respondent has ever used, ever gotten high or stoned, frequency of current use, and perceived availability of the drug ($\alpha = .85$).

*School Performance.* This variable is measured by school record data of the respondent's grade-point average for the previous academic year.

*Family Activities.* This measure is a single item assessing the number of hours each week the respondent spends doing things with his or her family.

All analyses controlled for gender; grade in school[4]; race/ethnicity; family composition (intact family vs. nonintact family, i.e., families that include both biological parents vs. families missing at least one biological parent); and socioeconomic status, a Hollingshead-type measure based on father's educational attainment, mother's educational attainment, and father's occupational status.

## Results

The presentation of findings is organized into two parts. First, we report the examination of the bivariate relationships of Wave-1 measures of unconventionality to the timing of subsequent transition to nonvirginity. Second, we report the assessment of the multivariate linkage of unconventionality at Wave 1 to the timing of subsequent transition to nonvirginity. Both sets of analyses were based on those participants who were virgins at Wave 1.

[4] Grade in school, rather than chronological age, was used as a control because of our interest in the contemporary heterosocial situation that grade membership represents. When the analyses reported in Tables 16.2, 16.3, 16.4, and 16.5 were replicated using age instead of grade as a control, results were essentially identical.

## *Predicting Time to First Sexual Intercourse: Bivariate Analyses*

The main focus of this paper is on the extent to which psychosocial and behavioral unconventionality are predictive of the timing of first sexual intercourse among participants who were virgins at Wave 1 (1989). Four nonvirginity status groups were established for use in the analyses: 209 participants whose first intercourse took place between Wave 1 and Wave 2 (Nonvirgin by Wave 2); 195 participants who began having intercourse between Wave 2 and Wave 3 (Nonvirgin by Wave 3); 177 participants whose first intercourse occurred between Wave 3 and Wave 4 (Nonvirgin by Wave 4); and 451 participants who were still virgins at Wave 4 (Wave-4 Virgin). These four groups vary in the time (number of years) that elapsed between the Wave-1 assessment and first sexual intercourse.

The four groups were compared on their psychosocial and behavioral measures of unconventionality at Wave 1, when they were all virgins. The analyses of variance controlled for gender, socioeconomic status, grade in school, and family composition through their inclusion as covariates. All analyses were done separately for White, Hispanic, and African-American adolescents. Results are presented in Tables 16.2, 16.3, and 16.4. Also presented in Tables 16.2 and 16.3, for reference, are unadjusted means on demographic variables used as control measures.

The data in Tables 16.2, 16.3, and 16.4 indicate that, for White and Hispanic adolescents, those who made an earlier transition to nonvirginity already differed, as virgins, in the expected direction of psychosocial and behavioral unconventionality from those who initiated intercourse later. Among African-American adolescents, however, there were no significant differences on the measures of unconventionality for the different nonvirginity status groups (see Table 16.4).

For White and Hispanic youths, earliness of sexual intercourse initiation was associated with higher value on independence than on academic achievement; lower expectations for academic achievement; greater tolerance of deviance; greater influence from peers than from parents (Whites only); less parental disapproval of problem behavior (Hispanics only); more friends who were involved in other problem behaviors; less involvement in the conventional behavior of school achievement; and more involvement in delinquent behavior, problem drinking, and marijuana use.

On 17 of the 18 measures where the *F* ratio was statistically significant, the adolescents who made the earliest transition to nonvirginity were the most unconventional group as Wave-1 virgins, and those who remained virgins at the final assessment in Wave 4 were the most conventional group as Wave-1 virgins. Furthermore, in nearly all of the cases where the *F* ratio was significant (seven out of nine instances among White youths and eight out of nine instances among Hispanic youths), the mean scores were perfectly ordered across the four groups: those who made the transition to nonvirginity within 1 year were most unconventional as virgins at Wave 1, followed, in order, by those who made the transition within 2 years, within 3 years, and not at all. Thus, although the actual size of many of the significant mean differences presented in Tables 16.2 and 16.3 is small, the overall pattern of attributes related to earlier initiation of intercourse is coherent and consistent.

**Table 16.2** Mean Scores on Wave 1 (1989) Measures of Unconventionality for Four Nonvirginity Status Groups (All Virgins at Wave 1) for Whites

| Wave 1 Measures | Nonvirgins at Wave 1[ac] | Nonvirgin by Wave 2[d] | Nonvirgin by Wave 3[e] | Nonvirgin by Wave 4[f] | Wave 4 Virgins[g] | *F* |
|---|---|---|---|---|---|---|
| *Demographic measures* | | | | | | |
| Grade in school | 8.2 | 8.1 | 8.0 | 7.9 | 7.8 | 2.53 |
| Socioeconomic status | 5.2 | 5.6 | 5.9 | 6.2 | 6.4 | 4.40* |
| Family composition | 1.5 | 1.5 | 1.5 | 1.5 | 1.6 | 1.74 |
| *Personality measures* | | | | | | |
| Independence-achievement value discrepancy | 9.9 | 9.8 | 9.4 | 9.2 | 9.0 | 2.79* |
| Expectation for achievement | 7.7 | 7.3 | 6.7 | 6.8 | 6.3 | 3.55* |
| Tolerance of deviance | 19.6 | 18.1 | 18.1 | 17.4 | 15.3 | 8.37* |
| *Perceived environment measures* | | | | | | |
| Parent-friends incompatibility | 5.7 | 5.1 | 5.2 | 5.2 | 5.2 | 0.07 |
| Parent-friends influence | 5.9 | 5.7 | 5.6 | 5.3 | 4.8 | 10.15* |
| Parental disapproval-approval of problem behavior | 2.9 | 2.7 | 2.7 | 2.6 | 2.6 | 1.21 |
| Friends as models for problem behavior | 5.9 | 5.3 | 5.4 | 4.5 | 4.1 | 18.47* |
| *Behavior measures* | | | | | | |
| Problem | | | | | | |
| Deviant behavior | 21.0 | 17.4 | 16.3 | 15.3 | 13.4 | 11.31* |
| Problem drinking | 6.9 | 4.3 | 4.3 | 3.9 | 3.3 | 7.61* |
| Marijuana involvement | 2.8 | 1.7 | 1.4 | 1.0 | 0.7 | 9.30* |
| Conventional[b] | | | | | | |
| School performance | 2.8 | 2.9 | 3.1 | 3.1 | 3.3 | 9.16* |
| Family activities | 2.9 | 3.6 | 3.2 | 3.4 | 3.5 | 1.54 |

*Note*: Means are adjusted for the effects of the following sociodemographic covariates: gender, socioeconomic status, grade in school, and family composition

No covariates were used in the analyses comparing mean differences on the demographic measures. These are unadjusted means

[a]Wave 1 nonvirgin means are included for descriptive purposes. These means are not included in the *F* test

[b]With the exception of the conventional behavior measures, higher scores indicate greater unconventionality

[c]$n = 73$

[d]$n = 57$

[e]$n = 80$

[f]$n = 81$

[g]$n = 232$

*$p \leq .05$

**Table 16.3** Mean Scores on Wave 1 (1989) Measures of Unconventionality for Four Nonvirginity Status Groups (All Virgins at Wave 1) for Hispanics

| Wave 1 Measures | Nonvirgins at Wave 1[ac] | Nonvirgin by Wave 2[d] | Nonvirgin by Wave 3[e] | Nonvirgin by Wave 4[f] | Wave 4 Virgins[g] | *F* |
|---|---|---|---|---|---|---|
| *Demographic measures* | | | | | | |
| Grade in school | 8.3 | 8.0 | 8.1 | 7.9 | 7.8 | 2.90* |
| Socioeconomic status | 4.0 | 3.8 | 3.9 | 4.1 | 3.5 | 2.61* |
| Family composition | 1.4 | 1.4 | 1.5 | 1.5 | 1.5 | 2.96* |
| *Personality measures* | | | | | | |
| Independence-achievement value discrepancy | 10.1 | 9.9 | 9.5 | 8.8 | 8.6 | 7.75* |
| Expectation for achievement | 8.4 | 8.1 | 8.4 | 7.5 | 7.2 | 4.85* |
| Tolerance of deviance | 20.2 | 18.7 | 17.6 | 16.6 | 16.0 | 3.89* |
| *Perceived environment measures* | | | | | | |
| Parent-friends incompatibility | 5.0 | 5.0 | 5.0 | 5.0 | 4.8 | 0.41 |
| Parent-friends influence | 4.9 | 5.0 | 4.9 | 4.7 | 4.6 | 1.58 |
| Parental disapproval-approval of problem behavior | 2.8 | 2.9 | 2.8 | 2.7 | 2.5 | 2.70* |
| Friends as models for problem behavior | 6.5 | 6.0 | 5.6 | 5.2 | 4.9 | 7.64* |
| *Behavior measures* | | | | | | |
| Problem | | | | | | |
| Deviant behavior | 21.0 | 17.8 | 17.0 | 15.5 | 14.1 | 7.51* |
| Problem drinking | 7.7 | 5.1 | 4.7 | 4.1 | 3.5 | 9.73* |
| Marijuana involvement | 4.0 | 3.0 | 2.2 | 1.5 | 1.2 | 14.50* |
| Conventional[b] | | | | | | |
| School performance | 2.2 | 2.3 | 2.5 | 2.6 | 2.7 | 5.42* |
| Family activities | 3.4 | 3.2 | 3.6 | 3.7 | 3.5 | 1.53 |

*Note*: Means are adjusted for the effects of the following sociodemographic covariates: gender, socioeconomic status, grade in school, and family composition

No covariates were used in the analyses comparing mean differences on the demographic measures. These are unadjusted means

[a]Wave 1 nonvirgin means are included for descriptive purposes. These means are not included in the *F* test

[b]With the exception of the conventional behavior measures, higher scores indicate greater unconventionality

[c]$n = 127$

[d]$n = 96$

[e]$n = 81$

[f]$n = 64$

[g]$n = 143$

*$p \leq .05$

These analyses were replicated for girls and boys separately, controlling race/ethnicity, socioeconomic status, grade in school, and family composition. In general, the means were ordered as anticipated for both genders (these data were not tabled; table available from Frances Costa upon request). Mean differences on measures of unconventionality were statistically significant in a greater number of instances for girls (10 measures) than for boys (7 measures). These data indicate that greater psychosocial and behavioral unconventionality is linked to earlier transition to nonvirginity for female and male adolescents.

Also presented in Tables 16.2, 16.3, and 16.4 are the mean scores of those participants who were already nonvirgins at Wave 1. Among White and Hispanic adolescents, this group of already sexually experienced youths was, as anticipated, the most unconventional on nearly all of the Wave-1 measures.

## *Predicting Time to First Sexual Intercourse: Multivariate Analyses*

The multivariate predictive relationship between psychosocial and behavioral unconventionality, on the one hand, and subsequent transition to nonvirginity, on the other, was assessed by the Cox proportional hazards regression method. This is a regression technique that can use continuous predictors to predict survival times and that can be applied to data that include censored observations (Christensen, 1987; Kelsey, Thompson, & Evans, 1986). Analyses were run to validate the assumption of proportionality of hazards (Trussell & Hammerslough, 1983), and they indicated that there was no serious violation.

The dependent variable in the Cox regressions was time from the Wave-1 assessment until report of first sexual intercourse. It was designated as the midpoint between the last report of virginity and the first report of intercourse: 0.5 years for those whose first intercourse occurred between Waves 1 and 2, 1.5 years for participants whose first intercourse took place between Waves 2 and 3, and 2.5 years for those whose first intercourse occurred between Waves 3 and 4. Two consecutive blocks of variables were entered into the prediction model: first, the sociodemographic control measures (gender, grade in school at Wave 1, socioeconomic status, and family composition) and, second, the predictor measures of psychosocial unconventionality. Four separate regressions were run this way, one for the personality predictors; one for the perceived environment predictors; one for the behavior predictors; and one for the combined set of personality, perceived environment, and behavior predictors.

Model improvement contributed by each set of unconventionality variables was assessed by the significance of the change in chi-square from a model containing only the sociodemographic control measures. Relative risk, that is, the ratio of the hazard of transition for adolescents with greater unconventionality compared to those with less unconventionality, is indicated by the antilog of the regression coefficient ($e^b$). If the relative risk is greater than 1.0, the variable is associated with

**Table 16.4** Mean Scores on Wave 1 (1989) Measures of Unconventionality for Four Nonvirginity Status Groups (All Virgins at Wave 1) for African-Americans

| Wave 1 Measures | Nonvirgins at Wave 1[ac] | Nonvirgin by Wave 2[d] | Nonvirgin by Wave 3[e] | Nonvirgin by Wave 4[f] | Wave 4 Virgins[g] | *F* |
|---|---|---|---|---|---|---|
| *Demographic measures* | | | | | | |
| Grade in school | 8.2 | 8.0 | 8.3 | 7.7 | 7.8 | 3.56* |
| Socioeconomic status | 5.2 | 5.0 | 5.2 | 5.6 | 5.5 | 1.47 |
| Family composition | 1.2 | 1.2 | 1.3 | 1.3 | 1.4 | 1.74 |
| *Personality measures* | | | | | | |
| Independence-achievement value discrepancy | 9.4 | 9.5 | 9.2 | 8.8 | 8.6 | 2.11 |
| Expectation for achievement | 7.4 | 7.7 | 7.5 | 7.7 | 7.6 | 0.04 |
| Tolerance of deviance | 17.6 | 16.1 | 15.0 | 15.4 | 14.7 | 0.94 |
| *Perceived environment measures* | | | | | | |
| Parent-friends incompatibility | 5.1 | 4.9 | 5.0 | 4.9 | 5.4 | 1.16 |
| Parent-friends influence | 4.8 | 4.7 | 5.2 | 4.8 | 4.4 | 2.37 |
| Parental disapproval-approval of problem behavior | 2.7 | 2.6 | 3.1 | 2.5 | 2.6 | 1.77 |
| Friends as models for problem behavior | 5.0 | 4.6 | 4.5 | 4.4 | 4.3 | 0.32 |
| *Behavior measures* | | | | | | |
| Problem | | | | | | |
| Deviant behavior | 17.2 | 16.1 | 14.9 | 14.4 | 14.3 | 1.34 |
| Problem drinking | 4.7 | 3.5 | 3.6 | 3.4 | 3.4 | 0.14 |
| Marijuana involvement | 1.9 | 1.1 | 0.6 | 0.9 | 0.9 | 0.85 |
| Conventional[b] | | | | | | |
| School performance | 2.3 | 2.5 | 2.6 | 2.4 | 2.7 | 1.51 |
| Family activities | 3.4 | 3.2 | 3.3 | 3.3 | 3.5 | 0.47 |

*Note*: Means are adjusted for the effects of the following sociodemographic covariates: gender, socioeconomic status, grade in school, and family composition

No covariates were used in the analyses comparing mean differences on the demographic measures. These are unadjusted means

[a]Wave 1 nonvirgin means are included for descriptive purposes. These means are not included in the *F* test

[b]With the exception of the conventional behavior measures, higher scores indicate greater unconventionality

[c]$n = 98$

[d]$n = 56$

[e]$n = 34$

[f]$n = 32$

[g]$n = 76$

*$p \leq .05$

increased risk of early transition to nonvirginity; if the relative risk is less than one, the variable is associated with decreased risk of early transition. Results are presented separately for White, Hispanic, and African-American adolescents in Table 16.5.

The data in Table 16.5 support the central hypothesis that antecedent psychosocial unconventionality in adolescence is associated with increased risk of earlier transition to nonvirginity. Measures from each of the three theoretical systems (Runs 1, 2, and 3) significantly improved prediction of transition to nonvirginity for White and Hispanic adolescents, $p \leq .01$, but not for African-American youths. For White and Hispanic adolescents, the prediction model for each of the three sets of unconventionality measures was statistically significant, $p \leq .001$.

As noted earlier, African-American boys accounted for a large share of those who were omitted from analyses due to unreliable data on sexual intercourse experience. It is possible that African-American boys who were included in the analyses may have been the source of undetected unreliable data regarding transition to nonvirginity; and, if that were the case, it could have adversely affected the fit of the model for African-American youths. Other possible explanations for the lack of fit of the model in this sample are taken up later in the Results section and in the Discussion section.

The regression coefficients reported in Table 16.5 reflect the contributions of the individual predictor measures to the risk of earlier transition to nonvirginity. For White and Hispanic adolescents, measures from all three theoretical systems were associated with a significant difference in risk of transition to nonvirginity. With respect to personality unconventionality (Run 1), greater tolerance of deviance was significantly associated with risk of transition for Whites, and higher value on independence than on achievement was significant for Hispanics. With respect to perceived environment unconventionality (Run 2), greater influence of friends relative to parents and having relatively more friends who engage in problem behavior were related to greater risk of transition for White adolescents, and having relatively more friends who engage in problem behavior was associated with greater risk for Hispanic adolescents. With respect to behavioral unconventionality (Run 3), deviant behavior, problem drinking, and poor school performance were associated with increased transition risk for White youths, and problem drinking was associated with increased transition risk for Hispanic adolescents. These findings support the contribution of unconventionality measures from each system of Problem Behavior Theory to transition proneness.

When all of the unconventionality measures were entered simultaneously as a block into the regression model (Run 4), their addition to the sociodemographic control measures significantly improved the model chi-square for White and Hispanic adolescents. Because of the degree of intercorrelation among the different measures of unconventionality, however, the direct influence of a number of the individual predictors on transition risk diminished in the model. For White and Hispanic youths, this overall model was statistically significant, $p < .001$. For

**Table 16.5** Survival Analyses Predicting Timing of Transition to Nonvirginity among Wave 1 Virgins by Race/Ethnicity

| | White | | Hispanics | | African-Americans | |
|---|---|---|---|---|---|---|
| Variables | β | exp (β) | β | exp (β) | β | exp (β) |
| Control Measures | | | | | | |
| Gender | −.05 | 1.0 | −.20 | 0.8 | .01 | 1.0 |
| Grade in school | .17* | 1.2 | .18* | 1.2 | .16 | 1.2 |
| Socioeconomic status | −.11** | 0.9 | .06 | 1.1 | −.07 | 0.9 |
| Family composition | −.26 | 0.8 | −.24 | 0.8 | −.36 | 0.7 |
| *Overall chi-square* | 16.4** | | 13.8** | | 6.6 | |
| Predictor sets | | | | | | |
| *Run 1: Personality measures*[a] | | | | | | |
| Independence-achievement value discrepancy | .03 | 1.0 | .08* | 1.1 | .08 | 1.1 |
| Expectation for achievement | .05 | 1.1 | .04 | 1.0 | −.02 | 1.0 |
| Tolerance of deviance | .04** | 1.0 | .02 | 1.0 | .02 | 1.0 |
| *Overall chi-square* | 37.3*** | | 33.0*** | | 10.8 | |
| *Change chi-square*[b] | 18.3*** | | 18.6*** | | 4.5 | |
| *Run 2: Perceived environment measures*[a] | | | | | | |
| Parent-friends incompatibility | −.05 | 0.9 | .02 | 1.0 | −.12 | 0.9 |
| Parent-friends influence | .15** | 1.2 | .04 | 1.0 | .09 | 1.1 |
| Parental disapproval-approval of problem behavior | .03 | 1.0 | .07 | 1.1 | .09 | 1.1 |
| Friends as models for problem behavior | .19*** | 1.2 | .11** | 1.1 | .03 | 1.0 |
| *Overall chi-square* | 65.3*** | | 28.7*** | | 13.0 | |
| *Change chi-square*[b] | 40.8*** | | 14.6** | | 6.2 | |
| *Run 3: Behavior measures* | | | | | | |
| Deviant behavior[c] | .39* | 1.5 | .25 | 1.3 | .28 | 1.3 |
| Problem drinking[c] | .41* | 1.5 | .53*** | 1.7 | −.10 | 0.9 |
| Marijuana involvement[c] | .28 | 1.3 | .22 | 1.2 | .13 | 1.1 |
| School performance[d] | .32** | 1.4 | .13 | 1.1 | .22 | 1.2 |
| Family activities[c] | −.02 | 1.0 | .13 | 1.1 | .25 | 1.3 |
| *Overall chi-square* | 57.8*** | | 46.8*** | | 15.4 | |
| *Change chi-square*[b] | 40.5*** | | 32.5*** | | 7.8 | |
| *Run 4: Total set of measures* | | | | | | |
| Independence-achievement value discrepancy[a] | .03 | 1.0 | .07 | 1.1 | .07 | 1.1 |
| Expectation for achievement[a] | .01 | 1.0 | .03 | 1.0 | −.08 | 0.9 |
| Tolerance of deviance[a] | .00 | 1.0 | .00 | 1.0 | .01 | 1.0 |
| Parent-friends incompatibility[a] | −.05 | 1.0 | −.02 | 1.0 | −.16* | 0.9 |
| Parent-friends influence[a] | .15** | 1.2 | .00 | 1.0 | .10 | 1.1 |
| Parental disapproval-approval of problem behavior[a] | .05 | 1.0 | .02 | 1.0 | .13 | 1.1 |

(continued)

**Table 16.5** (continued)

| Variables | White | | Hispanics | | African-Americans | |
|---|---|---|---|---|---|---|
| | β | exp (β) | β | exp (β) | β | exp (β) |
| Friends as models for problem behavior[a] | .09 | 1.1 | .02 | 1.0 | .00 | 1.0 |
| Deviant behavior[c] | .30 | 1.3 | .10 | 1.1 | .31 | 1.4 |
| Problem drinking[c] | .21 | 1.2 | .50** | 1.6 | −.38 | 0.7 |
| Marijuana involvement[c] | .14 | 1.2 | .14 | 1.1 | .32 | 1.4 |
| School performance[d] | .26* | 1.3 | .08 | 1.1 | .29 | 1.3 |
| Family activities[c] | −.08 | 0.9 | .06 | 1.1 | .29 | 1.3 |
| *Overall chi-square* | 72.3*** | | 50.3*** | | 25.6 | |
| *Change chi-square*[b] | 51.3*** | | 35.1*** | | 20.2 | |

[a]Variables entered as continuous measures are scored so that higher values represent greater unconventionality and, therefore, theoretically greater risk of transition
[b]The reported change chi-square represents model improvement contributed by predictor variables after entry of gender, grade in school, socioeconomic status, and family composition
[c]Based on median splits of distribution of values for these measures. For problem drinking and marijuana involvement, the contrasts are any involvement with no involvement
[d]Contrasts grade point average in lowest or middle tercile to the highest tercile, based on distribution of grade point average within each ethnic group
*$p \leq .05$
**$p \leq .01$
***$p \leq .001$

African-American adolescents, the overall model marginally approached significance, $p \leq .10$.[5]

Because a portion of the study sample was already sexually experienced at Wave 1, it is possible that sample selection bias may have affected the findings. Although we have reservations about the appropriateness of applying sample selection bias correction techniques to our data (see Stolzenberg & Relies, 1990; Udry & Billy, 1987), we nevertheless assessed the influence of sample selection on the predictive models presented in Table 16.5. Using a two-stage model of sample selectivity bias

[5] In order to test whether there were significant differences in the predictive model across the three racial/ethnic groups, a Cox regression analysis was run for the combined group of White, Hispanic, and African-American youths. Three consecutive blocks of variables were entered into the prediction model: first, sociodemographic control measures, including two dummy variables measuring race/ethnicity (White/non-White and Hispanic/non-Hispanic); second, the full set of 12 unconventionality measures; third, the interactions of each of the race/ethnicity measures with each of the other control measures and with each of the measures of unconventionality.

Results indicate a significant main effect of race/ethnicity in Step 1 of the analysis, but no significant improvement to the model at Step 3 when the set of interaction terms was entered. Although White adolescents are less likely to make an early transition to nonvirginity than non-White adolescents, the relationship of the control and unconventionality measures with time of transition is not statistically different for the three racial/ethnic groups.

proposed by Heckman (1979), we estimated the omitted selectivity variable with a probit model that included measures of gender, grade in school, socioeconomic status, family composition, and a summary measure of overall unconventionality.[6] The selectivity proxy variable was shown to have a significant effect in the African-American sample but not in the White and Hispanic samples.

When the regression analysis, including sociodemographic controls, all measures of unconventionality, and the measure of sample selectivity, was run for the African-American sample, the predictive model was statistically significant. Compared with the predictive model that did not include the selectivity measure, this model significantly improved prediction of transition to nonvirginity for African-American adolescents. In addition, personality, perceived environment, and behavior indicators of greater unconventionality were significantly associated with a greater risk of earlier transition to non-virginity. These findings suggest that sample selection bias may have had a detrimental influence on our ability to fit the predictive model to the data in the African-American sample. Given our reservations about the appropriateness of the correction for sample selection, these findings should be interpreted cautiously.

Although gender is one of the control variables used in the model, it was deemed informative also to test whether the explanatory model may differ for boys and girls. Cox regression analyses were run in which a third set of variables was added to the set of control variables and the total set of unconventionality measures. This third step in the analyses consisted of the interaction terms of gender with each of the 12 unconventionality measures. When these interaction terms were entered, there was no significant improvement in the prediction of risk of transition to nonvirginity for any of the racial/ethnic groups. These findings support the conclusion that the predictive model is similar for boys and girls. In addition, analyses presented in Table 16.5 were replicated for boys and girls separately (controlling race/ethnicity). Findings were very similar for the two genders. A table presenting these results is available from Frances Costa upon request.

The relationship of unconventionality to the survival of virginity from Wave 1 to Wave 4 can be illustrated using Cox regression analyses in which a single measure of overall unconventionality (described in Footnote 6) at Wave 1 is added to the block of sociodemographic control variables. This measure of unconventionality was dichotomized for the three racial/ethnic groups. Participants scoring at or below the median were defined as *conventional,* and those scoring above the median were defined as *unconventional.* The smoothed survival curves for the two groups, conventional and unconventional Wave-1 virgins, are presented in Figs. 16.1, 16.2, and 16.3

[6] This composite measure was computed by adding the standardized scores of the 12 measures of unconventionality: independence-achievement value discrepancy, expectation for achievement, tolerance of deviance, parent-friends incompatibility, parent-friends influence, parental disapproval-approval of problem behavior, friends as models for problem behavior, deviant behavior, problem drinking, marijuana involvement, school performance, and family activities. Scores were standardized separately for Whites, Hispanics, and African Americans. For respondents missing scores on two or fewer of the 12 measures, the missing values were replaced with the mean of the remaining scores.

for White, Hispanic, and African-American adolescents, respectively. The curves for conventional and unconventional Wave-1 virgins were significantly different for both White and Hispanic youths but not for African-American adolescents.

As can be seen in the figures, decreasing proportions of both conventional and unconventional Wave-1 virgins remained virgins, that is, "survived", at each subsequent wave of the study. More importantly, in all three racial/ethnic groups, the cumulative survival at each time point was lower for the unconventional Wave-1 youths than it was for the conventional Wave-1 youths. Among the White adolescents shown in Fig. 16.1, about 66% of the conventional Wave-1 virgins had not had intercourse, that is, survived, by Wave 4; this compares with only about 29% of the unconventional Wave-1 virgins who survived. Among the Hispanic Wave-1 virgins shown in Fig. 16.2, approximately 46% of those in the conventional group had not had intercourse by Wave 4; this compares with only about 22% of those in the unconventional group who survived. The comparable figures for the African-American adolescents in Fig. 16.3 are about 43% and 33%, respectively, the smallest difference in survival as virgins.

## Discussion

A significant developmental linkage between psychosocial and behavioral unconventionality, on the one hand, and earlier transition to nonvirginity, on the other, was demonstrated in this study. The relationship holds when the sociodemographic characteristics of gender, socioeconomic status, grade in school, and family composition are controlled. The present findings extend earlier work to show that the linkage applies to contemporary White and Hispanic urban adolescents. The relationship does not apply, however, to African-American youths.

Results of the bivariate analyses indicate that, for White and Hispanic youths, precursors of earlier transition to nonvirginity include personality characteristics—a higher value on independence relative to value on achievement, lower expectations for success in school, and greater tolerance of deviance; perceived environment characteristics—greater influence from peers than from parents, lower parental disapproval of problem behavior, and having relatively more friends who engage in problem behavior; and behavioral characteristics—lower school achievement and greater involvement in other problem behaviors, such as delinquency, problem drinking, and marijuana use. Despite the shared variance among the sets of unconventionality measures used in the multivariate analyses, a number of variables still emerged as antecedents of earlier transition to nonvirginity, including, for White youths, greater tolerance of deviance, greater influence from friends than from parents, more friends as models for problem behavior, greater involvement in delinquency and problem drinking, and lower school achievement, and, for Hispanic youths, a higher value on independence relative to achievement, more friends as models for problem behavior, and greater involvement in problem drinking.

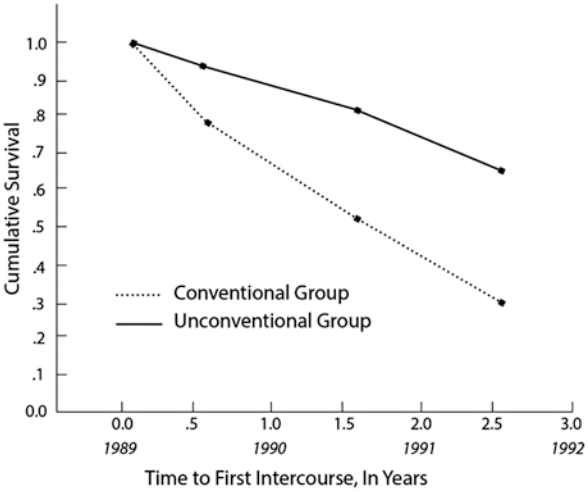


**Fig. 16.1** Survival curves for White adolescents

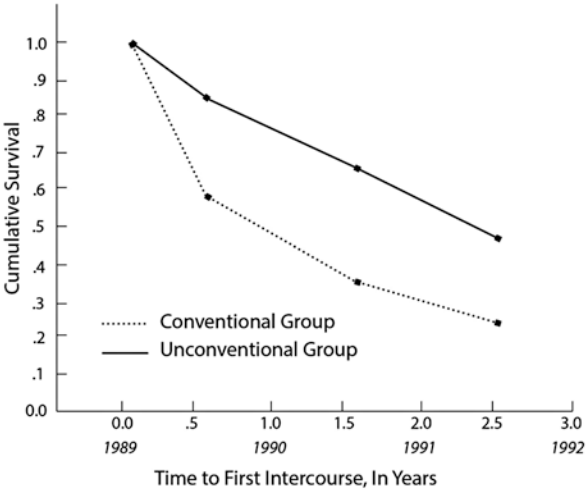


**Fig. 16.2** Survival curves for Hispanic adolescents

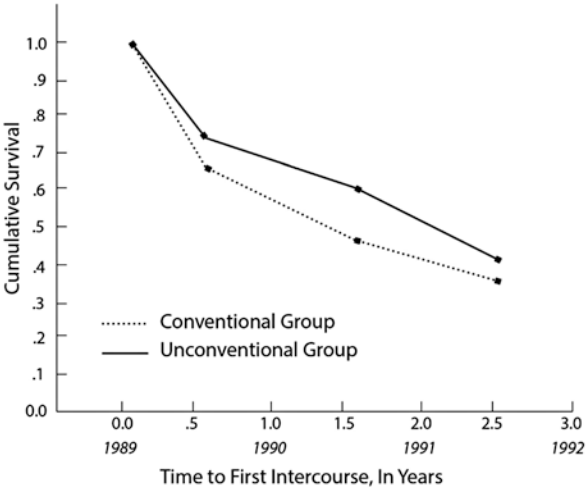


**Fig. 16.3** Survival curves for African-American adolescents

As the survival curves showed, adolescents who varied in antecedent unconventionality exhibited divergent developmental pathways with respect to sexual intercourse initiation. By Wave 4 (1992), there were major differences in the proportions of virgin survivors between the Wave-1 conventional and unconventional groups. In fact, over the three-year time course of the study, the proportion of survivors among conventional youths was roughly double that among unconventional youths. These findings hold for both the White and Hispanic adolescent samples but not for the African-American sample.

The findings are comparable to earlier work based on middle-class White adolescents studied in a small city more than twenty years ago (R. Jessor & S. L. Jessor, 1977), and they suggest a historical invariance in the relationship between unconventionality and early sexual intercourse. As was the case more than two decades ago, early intercourse, like other problem behaviors, can be understood, at least in part, as a departure from prevailing social norms, a departure influenced by the psychosocial instigations toward and controls against such behavior specified in Problem Behavior Theory. The present data also demonstrate the generality of this explanatory framework here applied to adolescents of different racial/ethnic and socioeconomic backgrounds.

Although the theoretical model fit well for both White and Hispanic youths, the linkage between greater unconventionality and earlier transition to nonvirginity did not hold for African-American adolescents. It is possible that this outcome may have to do with the relatively small number of African-American participants or with the fact that the African-American male participants were the source of the least reliable data on sexual behavior (this phenomenon was also noted by

Rowe & Rodgers, 1991). In addition, there was a significant effect of sample selection bias in the African-American sample, but not for White and Hispanic youths. As indicated earlier, we have concerns about the appropriateness of this correction in our data. The failure of the theoretical model to fit the African-American sample may also have to do, however, with differences in social structural factors or normative orientations. Stanton et al. (1993), for example, reported that, among impoverished African-American youths, sexual intercourse formed a different domain from other problem behaviors, as reflected by adolescents' own behaviors, their feelings about the behaviors, and their perceptions of friends' involvement in the behaviors.

In examining our data, it was evident that considerably higher proportions of African-American youths were from nonintact families, that is, families missing at least one biological parent (77%, compared with 45% of the White and 51% of the Hispanic sample). This observation led us to investigate whether the failure of the theoretical model to fit the African-American adolescents may have been affected by this difference in family composition. Indeed, additional Cox regression analyses revealed a significant interaction effect between family composition and the measure of overall unconventionality for African-American adolescents, but not for adolescents in the other two groups.

Cox regression analyses were then performed separately for Wave-1 African-American virgins living in intact families and Wave-1 African-American virgins living in nonintact families. Greater Wave 1 unconventionality was associated with earlier transition to nonvirginity for African-American youths living in intact families (overall model chi-square and chi-square change were both significant at $p \leq .10$), but not for African-American youths living in nonintact families. Survival curves plotted for African-American adolescents from nonintact families showed that, by Wave 4, the proportions of conventional and unconventional Wave-1 virgins who had not yet initiated intercourse were nearly identical (about 34%). Survival curves plotted for African-American adolescents living in intact families, however, showed that a substantially greater proportion of Wave-1 conventional than unconventional youths were still virgins at Wave 4 (64% vs. 32%).

Although these findings were of marginal statistical significance, they are, nevertheless, important and suggestive. They help to illuminate the way in which sociodemographic factors may qualify the relationship of psychosocial characteristics to early sexual activity among African-American adolescents. The importance of family structure has recently been implicated in the risk of premarital births, a different but not unrelated indicator of sexual behavior. Wu and Martinson (1993) found that the strength of the linkage between family structure (intact vs. nonintact) and premarital births varied as a function of race/ethnicity, being stronger for Whites and Hispanics and weaker for African Americans. In the present study, for African-American youths living in nonintact families, earlier initiation of sexual intercourse appears to be independent of variation in psychosocial and behavioral unconventionality. Early sexual behavior may have different

determinants and even different normative status in different sociodemographic subgroups in the African-American community. Further research to explore these possibilities would be valuable.

Findings from this study also indicated that earlier transition to nonvirginity was linked to greater psychosocial and behavioral unconventionality for both male and female adolescents. These results contrast with those reported by Udry and his colleague (Udry, 1988; Udry & Billy, 1987), who found that stronger bonds to conventional society are related to lower likelihood of engaging in sexual intercourse for girls but not for boys. Differences in measures of psychosocial variables may at least partly account for this discrepancy in findings. As Udry (1988) noted, his research omitted social-control theory variables "that have been shown to be important in other research." (p. 718).

Several limitations of this study need to be noted. First, the Wave-1 sample represented only 60% of the students who were asked to take part in the study, and only 66% of the Wave-1 sample participated in all three of the subsequent data collections. The initial sample appears not to have been seriously distorted by the less-than-desirable level of participation in Wave 1, however, and the longitudinal sample does not appear to have been seriously distorted by subsequent attrition between Waves 1 and 4.

A second limitation is that the data are based solely on participants' self-reports; the findings could, therefore, reflect some common method factor. Third, it is possible that, despite clear safeguards to ensure the confidentiality of the data, participants may have felt uneasy reporting on sensitive matters such as sexual behavior and drug use. On this point, however, the longitudinal nature of the study enabled us to rely on the multiple reports of behavior statuses and involvement in order to identify inconsistencies in the data.

Despite these limitations, the present results replicated our earlier findings in a different historical period (R. Jessor & S. L. Jessor, 1977; R. Jessor et al., 1983; S. L. Jessor & R. Jessor, 1975) and extended them to a more socioeconomically and ethnically diverse population of youths. The findings are theoretically coherent, and they demonstrate the continuing relevance of psychosocial and behavioral unconventionality to an understanding of early sexual behavior.

**Acknowledgments** This research was carried out as part of a larger project supported by the William T. Grant Foundation Grant 88119488 to Richard Jessor.

We appreciate the cooperation and support of the central school administration, in particular its director of research, and of the school principals and assistant principals. We thank Jani Little, Jill Van Den Bos, and Mark Turbin for their contributions to this research. The comments of Margaret Ensminger, Barbara Morse, Anne Weiher, and Jane Menken on earlier drafts of this paper were very helpful. The paper also benefitted from the thoughtful reviews of four anonymous referees.

## Appendix

Means and Standard Deviations on Measures of Unconventionality and Sociodemographic Characteristics for Study Participants, Subjects Omitted from Analyses, and Subjects Lost to Attrition

| | Four-Wave Participants Used in Analyses[a] | | | Four-Wave Participants Omitted from Analyses[bd] | | | Participants Lost to Attrition[c] | | |
|---|---|---|---|---|---|---|---|---|---|
| Measures | M | SD | Range | M | SD | Range | M | SD | Range |
| Independence-achievement value discrepancy | 9.29 | 2.11 | 1–17 | 9.23 | 2.08 | 4–15 | 9.50 | 2.29 | 2–17 |
| Expectation for achievement | 7.36 | 2.53 | 4–12 | 7.63 | 2.53 | 4–12 | 8.25 | 2.54 | 4–12 |
| Tolerance of deviance | 17.18 | 6.10 | 10–40 | 19.11 | 6.96 | 10–40 | 18.94 | 6.82 | 10–40 |
| Parent-friends incompatibility | 5.10 | 1.62 | 3–9 | 5.21 | 1.58 | 3–9 | 5.11 | 1.62 | 3–9 |
| Parent-friends influence | 4.95 | 1.45 | 3–9 | 4.95 | 1.50 | 3–9 | 5.04 | 1.53 | 3–9 |
| Parental disapproval/ approval of problem behavior | 2.69 | 0.92 | 2–6 | 2.71 | 1.07 | 2–6 | 2.81 | 1.02 | 2–6 |
| Friends models for problem behavior | 5.04 | 1.86 | 3–11 | 5.02 | 1.92 | 3–12 | 5.77 | 2.06 | 3–12 |
| Deviant behavior | 16.19 | 6.68 | 10–50 | 17.10 | 7.69 | 10–50 | 18.99 | 8.33 | 10–50 |
| Problem drinking | 4.41 | 3.08 | 3–23 | 4.32 | 3.20 | 3–24 | 5.92 | 4.62 | 3–24 |
| Marijuana involvement | 1.69 | 2.16 | 0–8 | 1.57 | 1.80 | 0–8 | 2.76 | 2.72 | 0–8 |
| School performance | 2.72 | 0.82 | 0–4 | 2.48 | 0.75 | 0.6–3.9 | 2.08 | 0.87 | 0–4 |
| Family activities | 3.40 | 1.42 | 1–6 | 3.40 | 1.42 | 1–6 | 3.30 | 1.52 | 1–6 |
| Grade in school | 7.99 | 0.81 | 7–9 | 7.81 | 0.80 | 7–9 | 8.04 | 0.82 | 7–9 |
| Socioeconomic status | 5.02 | 1.85 | 1–8.3 | 4.74 | 1.84 | 1–8.3 | 4.37 | 1.73 | 1–8.3 |
| Family composition | 1.45 | 0.50 | 1–2 | 1.40 | 0.49 | 1–2 | 1.26 | 0.44 | 1–2 |

[a] $n = 1330$

[b] $n = 171$

[c] $n = 819$

[d] These four-wave participants were omitted from analyses on the basis on incomplete, inconsistent, or untrustworthy responses to questions about sexual behavior

## References

Alexander, C. S., Ensminger, M. E., Kim, Y. J., Smith, B. J., Johnson, K. E., & Dolan, L. J. (1989). Early sexual activity among adolescents in small towns and rural areas: Race and gender patterns. *Family Planning Perspectives, 21*(6), 261–266.

Aneshensel, C. S., Becerra, R. M., Fielder, E. P., & Schuler, R. H. (1990). Onset of fertility-related events during adolescence: A prospective comparison of Mexican American and non-Hispanic white females. *American Journal of Public Health, 80*(8), 959–963.

Cates Jr., W. (1991). Teenagers and sexual risk taking: The best of times and the worst of times. *Journal of Adolescent Health, 12*(2), 84–94.

Centers for Disease Control. (1992). Sexual behavior among high school students--United States, 1990. *Morbidity and Mortality Weekly Report, 40*(51–52), 885–888.

Christensen, E. (1987). Multivariate survival analysis using Cox's regression model. *Hepatology, 7*(6), 1346–1358.

Donovan, J. E., & Jessor, R. (1985). Structure of problem behavior in adolescence and young adulthood. *Journal of Consulting and Clinical Psychology, 53*(6), 890–904.

Elliott, D. S., & Morse, B. J. (1989). Delinquency and drug use as risk factors in teenage sexual activity. *Youth & Society, 21*(1), 32–60.

Furstenberg, F. F., Morgan, S. P., Moore, K. A., & Peterson, J. L. (1987). Race differences in the timing of adolescent intercourse. *American Sociological Review, 52*(4), 511–518.

Hayes, C. D. (Ed.). (1987). *Risking the future: Adolescent sexuality, pregnancy, and childbearing* (Vol. 1). Washington, DC: National Academy Press.

Heckman, J. J. (1979). Sample selection bias as a specification error. *Econometrica, 47*(1), 153–161.

Hogan, D. P., & Kitagawa, E. M. (1985). The impact of social status, family structure, and neighborhood on the fertility of black adolescents. *American Journal of Sociology, 90*(4), 825–855.

Jessor, R. (1984). Adolescent development and behavioral health. In J. D. Matarazzo, S. M. Weiss, J. A. Herd, N. E. Miller, & S. M. Weiss (Eds.), *Behavioral health: A handbook of health enhancement and disease prevention* (pp. 69–90). New York: John Wiley & Sons.

Jessor, S. L., & Jessor, R. (1975). Transition from virginity to nonvirginity among youth: A social-psychological study over time. *Developmental Psychology, 11*(4), 473–484.

Jessor, R., & Jessor, S. L. (1977). *Problem behavior and psychosocial development: A longitudinal study of youth*. New York: Academic Press.

Jessor, R., & Jessor, S. L. (1978). Theory testing in longitudinal research on marihuana use. In D. B. Kandel (Ed.), *Longitudinal research on drug use: Empirical findings and methodological issues* (pp. 41–71). Washington, D.C.: Hemisphere Publishing Corporation.

Jessor, R., Costa, F., Jessor, L., & Donovan, J. E. (1983). Time of first intercourse: A prospective study. *Journal of Personality and Social Psychology, 44*(3), 608–626.

Jessor, R., Donovan, J. E., & Costa, F. M. (1991). *Beyond adolescence: Problem behavior and young adult development*. New York: Cambridge University Press.

Kelsey, J. L., Thompson, W. D., & Evans, A. S. (1986). *Methods in observational epidemiology*. New York: Oxford University Press.

Ketterlinus, R. D., Lamb, M. E., & Nitz, K. (1991). *Problem behavior lifestyles of virgin and sexually experienced males*. Paper presented at the meeting of the Society for Research on Child Development, Seattle, WA.

Miller, B. C., & Sneesby, K. R. (1988). Educational correlates of adolescents' sexual attitudes and behavior. *Journal of Youth and Adolescence, 17*(6), 521–530.

Rosenbaum, E., & Kandel, D. B. (1990). Early onset of adolescent sexual behavior and drug involvement. *Journal of Marriage and the Family, 52*(3), 783–798.

Rowe, D. C., & Rodgers, J. L. (1991). An "epidemic" model of adolescent sexual intercourse: Applications to national survey data. *Journal of Biosocial Science, 23*(2), 211–219.

Sonenstein, F. L., Pleck, J. H., & Ku, L. C. (1991). Levels of sexual activity among adolescent males in the United States. *Family Planning Perspectives, 23*(4), 162–167.

Stanton, B., Romer, D., Ricardo, I., Black, M., Feigelman, S., & Galbraith, J. (1993). Early initiation of sex and its lack of association with risk behaviors among adolescent African-Americans. *Pediatrics, 92*(1), 13–19.

Stolzenberg, R. M., & Relles, D. A. (1990). Theory testing in a world of constrained research design: The significance of Heckman's censored sampling bias correction for nonexperimental research. *Sociological Methods & Research, 18*(4), 395–415.

Thornton, A., & Camburn, D. (1989). Religious participation and adolescent sexual behavior and attitudes. *Journal of Marriage and the Family, 51*(3), 641–653.

Torres, A., & Singh, S. (1986). Contraceptive practice among Hispanic adolescents. *Family Planning Perspectives, 18*(4), 193–194.

Trussell, J., & Hammerslough, C. (1983). A hazards-model analysis of the covariates of infant and child mortality in Sri Lanka. *Demography, 20*(1), 1–26.

Udry, J. R. (1988). Biological predispositions and social control in adolescent sexual behavior. *American Sociological Review, 53*(5), 709–722.

Udry, J. R., & Billy, J. O. G. (1987). Initiation of coitus in early adolescence. *American Sociological Review, 52*(6), 841–855.

Wu, L. L., & Martinson, B. C. (1993). Family structure and the risk of a premarital birth. *American Sociological Review, 58*(2), 210–232.

Zelnik, M., Kantner, J. F., & Ford, K. (1981). *Sex and pregnancy in adolescence*. Beverly Hills: Sage Publications.