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Developmental Patterns of Sex Differences in Delinquency Among African American Adolescents: A Test of the Sex-Invariance Hypothesis

Sung Joon Jang[1] and Marvin D. Krohn[2]

This paper addresses a developmental issue concerning longitudinal patterns of sex differences in delinquency. Hirschi and Gottfredson argue that the age-delinquency relation is invariant across sex and that sex differences in delinquency are invariant over time as well. A combination of these two propositions generates a hypothesis, called here the sex-invariance hypothesis, that sex differences in delinquency are invariant over developmental stages of adolescents. To test the sex-invariance hypothesis, nine waves of panel data collected from a representative urban sample of African American adolescents are analyzed. The overall findings show that sex differences in delinquency tend to vary as the subjects grow older, rather than remain constant as the invariance thesis posits. Specifically, sex differences in delinquency peak at the age of 15 and thereafter declines with age. We also find that parental supervision significantly explains sex differences in delinquency for younger adolescence, but not for older adolescence.

KEY WORDS: developmental patterns; sex differences; delinquency; parental supervision; African American.

1. INTRODUCTION

The relationship between age and crime continues to be of central importance to criminological research, theory and policy. There is general agreement that criminal behavior begins about the age of 10, peaks at ages 15–17 and then steadily declines. What is more controversial is whether this distribution varies for different groups, historical periods, type of crimes and other social conditions.

Hirschi and Gottfredson (1983) are the leading proponents of the argument that the age effect on crime does not vary over time, place, demographic

[1]Department of Sociology, The Ohio State University, 300 Bricker Hall, 190 North Oval Mall, Columbus, Ohio 43210.
[2]Department of Sociology, The University at Albany, State University of New York, Albany, New York 12222.

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group and type of crime. This assumption has led them to derive a number of corollary hypotheses that may have important implications for how we think about and research crime. One specification of their thesis is that the relationship between sex and crime does not vary as youth develop through their adolescent years.

While the last decade has witnessed an upsurge of the number of studies on sex differences in delinquency, there has been a consistent lack of interest in developmental patterns of sex differences. Previous studies based on cross-sectional data have repeatedly confirmed that boys have higher rates of delinquency than girls, but have not been able to investigate whether this difference varies as they grow older. The paucity of developmental interest is somewhat surprising given the interest in historical patterns of sex differences in crime and delinquency (Adler, 1975; Simon, 1975; Canter, 1982; Chesney-Lind and Shelden, 1992; Datesman and Scarpitti, 1980a; Figueira-McDonough, 1984; Giordano and Cernkovich, 1979; Hagan, 1985; Leonard, 1982; Mukherjee and Fitzgerald, 1981; Steffensmeier and Allan, 1991; Steffensmeier and Steffensmeier, 1980).

This neglect of the developmental approach to sex differences in delinquency can be attributed to two major reasons. First, availability of longitudinal data has been limited. To examine developmental patterns of sex differences in delinquency, data need to be collected from a relatively large number of female as well as male adolescents, spanning different developmental stages of adolescence. Secondly, contemporary theories of delinquency provide limited guidance in formulating a hypothesis about developmental changes in sex differences in delinquency and have not been applied to explain such changes because they rarely incorporate the developmental trajectory of adolescence into their explanations of delinquency. While there has been a limited number of studies that emphasize the importance and the necessity of developmental perspectives in understanding delinquency (e.g., Gillmore *et al.*, 1991; Laub and Sampson, 1993; Loeber and Le Blanc, 1990; Thornberry, 1987), few of them directly discuss the developmental issues related to sex differences in delinquency.

The present study uses self-report data from a panel study of African American youths to examine two competing models of the difference in the delinquency rates of boys and girls as they age through the adolescent years. The first, called the sex-invariant model, stems from the work of Hirschi and Gottfredson (1983; Gottfredson and Hirschi, 1990). This model assumes that the causes of delinquency are established early in life and, as a result, differences between male and female delinquency will remain relatively constant throughout adolescence. The second, called the sex-variant model, stems from a more general developmental perspective. This model assumes that the causes of behaviors change over time and that the developmental

pace at which boys and girls are socialized can vary. As a result, it assumes that differences between male and female delinquency can vary substantially through adolescence.

1.1. Age-Delinquency Relation: Sex-Variant or Sex-Invariant?

Hirschi and Gottfredson (1983) contend that the general age distribution of crime is found for most types of crime, groups, and other social conditions. In other words, they assert that the age effect on crime is "sufficiently invariant" (p. 552).

The premise that the age distribution is invariant is then used to critique a number of practices and beliefs in doing research on crime. For example, Hirschi and Gottfredson (1983) suggest that theories should not be criticized for their inability to explain the "maturation phenomenon." They argue that "a given theory, in which the rate for the low-rate group is simply a constant proportion of that for the high-rate group, holds true at all age levels" (p. 565). The implication of this position is that the age effect is independent of variables incorporated in a theory of crime (p. 565).

In unraveling the logic of their argument, Hirschi and Gottfredson (1983) come to the conclusion that longitudinal research is "unjustified and potentially misleading" (p. 579). This conclusion has generated a substantial amount of reaction and debate (Greenberg, 1985; Blumstein *et al.*, 1988a, b). The implications of Hirschi and Gottfredson's age invariance argument for research on crime are substantial and must be carefully evaluated.

More recently, Gottfredson and Hirschi (1990) applied their thesis to the distribution of crime for males and females. Specifically, they disagree with a position which suggests "considerable flexibility in the age distribution by sex," arguing that "the age-crime relation is *invariant* across sex" (p. 126, *emphasis* in original). While few would disagree with their statements about the existence and the persistence of sex differences in criminal acts, their argument about the stability of the gender effect on criminal involvements over time is very much relevant to a developmental perspective on sex differences in delinquency and, thus, requires careful, empirical verification. Gottfredson and Hirschi (1988) acknowledge that certain variations in the age-crime curve can be expected under different conditions, but claim that the similarities across conditions are more important for theory and policy considerations than are the differences. They also state that the sex differences may be due to differences in "crime" (e.g., opportunity) as well as "criminality" (e.g., low self-control).

Hirschi and Gottfredson's invariance thesis enables us to establish a hypothesis about the developmental patterns of sex differences in delinquency. The thesis posits that (1) the age-crime relation is invariant across

sex and (2) sex differences are invariant over age as well. These two invariance propositions can be combined and converted into a developmental hypothesis concerning sex differences in delinquency: that is, sex differences in delinquency do not vary over developmental stages of adolescence. In this paper, we call the null hypothesis the sex-invariance hypothesis. On the other hand, the alternative or the research hypothesis becomes sex-variance hypothesis, which posits that there exist statistically significant changes in sex differences in delinquency over a certain developmental time period.

Thus, if a single parameter is used to measure sex differences at one point in time and the magnitudes of the parameter do not vary significantly over a developmental time span, then it can be concluded that the developmental pattern of sex differences in delinquency is invariant. On the other hand, the magnitude of the parameter may vary with age, suggesting that the age-delinquency relation is not invariant across sex.

Although prior studies have not directly examined the implications of Hirschi and Gottfredson's argument, they are relevant to the issue examined in the present study. We now turn to a review of selected research on sex differences in the age–delinquency relationship.

1.2. Prior Research

Sex-specific findings of previous studies on the relationship between age and delinquency provide a helpful clue to our investigation of longitudinal patterns. For example, Hindelang (1981) finds that sex differences in delinquency and crime tend to vary across different age groups based on data from the National Crime Survey[3] for 1973–1977. Specifically, his examination of variations in sex-race-age-specific incidence rates (i.e., estimated annual rates) of offending for total personal crimes (rape, robbery, assault, and larceny from the person) reveals that: the rates consistently increase among male offenders between the age of 12–17 and 18–20, whereas the opposite trend is found for female offenders over the same age span. This diverging pattern of the age-crime relation between males and females is the same for whites and African Americans.[4] Although Hindelang acknowledges that there are some data limitations,[5] his findings tend to suggest that the age-crime relationship is not invariant across sex.

[3]While the National Crime Survey (NCS) has recently been renamed as the National Crime Victimization Survey (NCVS), the present study uses the old name to refer to the survey given the time when the reviewed study based on the data was conducted.

[4]In both sex groups, the offending rate for African Americans is higher than that for whites: for both males and females, the African American to white ratio of incidence rate of offending is about 5:1.

[5]For example, Hindelang (p. 471) points out that the NCS "undercount all offenses, particularly assault . . . and to be subject to certain time-in-panel biases which reduce reported victimizations." More important to the present issue is that reported age of offender is likely to be inaccurate because it is very difficult for a victim to estimate the offender's age accurately.

Similarly, Gold's (1970) self-report study suggests that the age-delinquency relation may not be the same for boys and girls. Specifically, he reports that: "Whatever impact age had on delinquent behavior, it was most sharply felt by the boys at about the time they turned 14. For girls, however, it was spread more evenly over the years from 13 to 16" (p. 68). Gold then speculates that the differences observed between boys and girls in the age-delinquency relationship may have to do with factors like physical growth (e.g., puberty) and maturation. While he does not further develop this argument, his findings seem to be more consistent with a sex-variance explanation of the age-delinquency relation.

In his review article on the age-crime relation, Farrington (1986) concludes that the age-crime curve is not invariant across sex, while many curves appear to be "superficially similar" (p. 235) in peak ages of crime. Specifically, he examines male–female ratios at different ages using English and American official crime data, and finds that the ratios of male to female offending "vary substantially" (p. 191) with age. Based on these findings, Farrington emphasizes that the observed interaction between age and sex is an "age-crime phenomenon that needs to be explained" (p. 200). According to his analysis, the sex ratio tends to reach a peak at mid- to late adolescence or young adulthood, and thereafter decreases steadily at later ages, indicating that sex differences in delinquency and criminality can vary over the life course.[6] Thus, if we focus on the period of adolescence and part of early adulthood, we should expect to see an upward linear or a curvilinear (i.e., upward and then downward) pattern of sex differences in illegal acts rather than a pattern of constancy over the age span.

1.3. Development, Supervison and Sex Differences

Most theoretical work that addresses the differences in the rates of male and female delinquency assumes that differences in the way males and females are socialized in the home play a primary role (Baldwin, 1983). One important aspect of this differential socialization is the degree of supervision parents exercise over daughters compared to sons. From a very early age (Lewis, 1987) through adolescence (Hagan *et al.*, 1988; Hollin, 1987; Newson and Newson, 1987; Nye, 1958; Stockard and Johnson, 1992; White and LaGrange, 1987), females are encouraged to stay closer to home and their behaviors and activities are more likely to be monitored by their parents than those of their male counterparts. Because parental supervision is often found to be a significant predictor of delinquency (Brook *et al.*, 1989; Gove

[6]The male-female ratio reached a peak at age sixteen to twenty-two, for American nonviolent offenders (4.6) and for English offenders (7.5–9.5) and then declined steadily to only about two at the oldest ages. For American violent offenders, the ratio reached a peak of 10.4 at age eighteen, but never fell below 7.7, and reached 10.4 again at age sixty to sixty-four.

and Crutchfield, 1982; Hagan *et al.*, 1985, 1988; Krohn *et al.*, 1992; Krohn and Massey, 1980; LaGrange and White 1985; Wiatrowski *et al.*, 1981), and females are more likely to be supervised, the assumption that parental supervision may explain the differences in male and female delinquency rates is a plausible one to make.[7]

While parental supervision is a strong predictor of delinquency as previous research shows, Thornberry's (1987) interactional theory posits that the variable's importance in explaining delinquent behavior is time-variant. Specifically, the constraining effect of parental supervision exists at relatively early ages, but is expected to gradually lose its significance over time as adolescents mature, demands for independence increase, the process of individuation from parents goes forward, and parents are likely to be less vigilant (Loeber and Le Blanc, 1990). His own and other research findings are consistent with the development perspective on the explanatory ability of parental supervision for delinquency (Agnew, 1985; Jang, 1992; LaGrange and White, 1985).

The issue that is of special interest here is whether the ability of parental supervision in explaining sex differences in delinquency varies at different ages. Chesney-Lind and Shelden (1992) argue that as youth proceed through the adolescent years, the process of becoming more independent from parents takes place to a greater extent for boys than for girls. Through mid-adolescence, girls continue to be closely monitored by their parents because their parents become increasingly concerned about their daughters' "future" (e.g., marriage) and, thus, "protect" them by increasing their control. Boys, on the other hand, are given more leeway. In later adolescence, however, parents increasingly lose control over both males and females (Stockard and Johnson, 1992), thus reducing the expected differences in behavioral outcomes.

In addition, there is some speculation that cultural changes in the double standard applied to females and males may have the effect of minimizing these differences in the relative degree of control over males and females. The impact of increasingly equal treatments between boys and girls will be greater for girls because they have been more controlled and supervised by their parents and society as compared to boys (Duke, 1978; Gold 1970). These period effects may result in a tendency for the ratio of male and female crime to converge, especially as females reach later adolescence.

Other related research findings come from Seyditz (1991) who has examined the differential impact of both direct (i.e., supervision) and indirect

[7]However, research examining this issue demonstrates that while parental supervision may have some effect on the sex-delinquency relationship, it does not fully explain it (Jang, 1992; Jensen and Eve, 1976; White and LaGrange, 1987; Simons *et al.*, 1980; Hill and Atkinson, 1988).

(i.e., attachment) parental controls on males and females of different ages. She found that these controls were most effective during mid-adolescence as Chesney-Lind and Shelden's (1992) argument would predict, even though her research is limited by the fact that her cross-sectional data set only allowed for comparisons of different adolescents across different age groups. Thus, based on theories and research findings above, it can be hypothesized that parental supervision has more explanatory ability for the sex-delinquency relationship during early through middle adolescence but the ability declines during later adolescence.

1.4. Summary

If the social-control gap between boys and girls remains constant as they grow older, the sex-invariance hypothesis is likely to be supported as long as it is assumed that measurement errors are random across sex groups and that cohort and period effects on delinquency are not different for boys and girls. But, if not, the scope of Hirschi and Gottfredson's invariance thesis may need to be restated. The present study focuses on a test of the sex-invariance hypothesis using nine waves of data collected from when the subjects were going through their adolescent years from early through late adolescence. We will first examine whether or not the ratio of male to female delinquency varies at different ages. We will then examine a leading developmental explanation of the sex differences in delinquency rates by focusing on the role of parental supervision.

2. METHOD

Previous studies of the age-delinquency relationship are often based on comparisons of delinquent involvements among different age groups or age cohorts rather than those of the same group of adolescents observed over a certain age span (Gold, 1970; Hindelang, 1981; LaGrange and White, 1985; Monahan, 1960; but see Elliott *et al.*, 1989; Farrington, 1986). The age-delinquency curves reported in such studies indicate that age groups are different in their delinquent activities; they do not indicate how the levels of delinquency change over time as adolescents grow (Greenberg, 1985). An interpretation of the age-delinquency curves in light of developmental changes would be more justifiable if the age groups considered are comparable to each other (Blumstein *et al.*, 1988a). If such comparability can not be convincingly demonstrated, observed differences in delinquency across the age groups are likely to reflect something other than developmentally-

related differences (e.g., period and cohort effects).[8] By examining the same individuals over a focused period of time (i.e., adolescence), this study circumvents this problem.

2.1. Sample

The data we analyze are drawn from the Rochester Youth Development study (RYDS), a multiwave panel study designed to examine the development of delinquent behavior and drug use among adolescents. Each sample member and the adult primarily responsible for his or her care[9] are interviewed at six-month intervals. Data are also collected from schools, the police department, court, social welfare offices, and other agencies that have contact with youth. Although the RYDS uses this broad-based data collection strategy, the present analysis is based on information collected in adolescent interviews at waves 1 through 9. At wave 1 the students were in the Spring semester of their seventh or eighth grade and at wave 9 they were in the Spring semester of twelfth grade or high school graduates.

The sampling plan of the RYDS is designed to oversample youth at high risk for serious delinquency including drug use since the base rates for these behaviors are relatively low (Wolfgang *et al.*, 1987; Elliott *et al.*, 1989). To accomplish this, while still being able to generalize the findings to a population of urban adolescents, the following strategy was used. First, the target population was limited to seventh and eighth grade students in the public schools of a city, Rochester, New York, that has a diverse population and a relatively high crime rate.[10] Second, a stratified sample was selected from the target population so that: (1) high-risk youth are overrepresented; and (2) the findings can be appropriately weighted to represent the target population.

The sample was stratified on two dimensions. First, males were oversampled (75% vs 25%) because they are more likely than females to be chronic offenders and to engage in serious delinquency (Blumstein *et al.*, 1986). Second, students from high crime areas of the city were oversampled on the premise that crime rates and many delinquent opportunities are localized and that subjects residing in high crime rate areas are at greater risk

[8]Analyzing seven-cohort and six-wave panel data from the National Youth Survey, Elliott and his associates (1989) demonstrate that there exists a "true age effect," separated from period and cohort effects on delinquency and drug-using behavior.

[9]In 85% of the cases the primary caretaker was the natural mother, in 6% it was the natural father, and in the remaining 9% it was another adult.

[10]The city of Rochester had an index crime rate of 9351 in 1986, considerably above the national rate (5480), that of New York State (5768), and even that of New York City (8847) (Flanagan and Jamieson, 1988).

for offending. To identify high crime areas, each census tract in Rochester was assigned a resident arrest rate reflecting the proportion of the tract's adult population arrested by the Rochester police in 1986.

There were a total of 4013 students in the seventh and eighth grades in the Spring of 1988 and of these, 3372 (84%) were eligible for the sample.[11] All eligible cases were assigned to their census tract of residence at the beginning of the sample selection. To generate a final panel of 1000 students, 1334 were selected, based on an estimated non-participation rate of approximately 25% (Elliott *et al.*, 1983). The 1334 cases were selected in the following way. First, students in the census tracts with the highest resident arrest rates, approximately the top one-third, were selected with certainty. That is, all eligible students in these tracts were asked to participate in the study. Second, students in the remaining census tracts were selected at a rate proportionate to the tract's contribution to the overall resident arrest rate. As a tract's resident arrest rate declined, the proportion of the sample drawn from that tract also declined. Once the number of students to be selected from a tract was determined, the student population in the tract was stratified by sex and grade, and students were selected from those strata at random. Based on these procedures, a final panel of 987 students and their families was selected for the study.[12] Because the true probability of each adolescent being selected is known, the sample can be weighted to represent all seventh and eighth graders in the Rochester Public Schools. The sample is weighted in the analysis to follow.[13]

Current analysis is based on 534 African American adolescents for whom interviews were completed for waves 1 through 9. Only African American respondents are used in this analysis because the unique aspects of the sampling design resulted in an insufficient number of white and Hispanic females. This represents 81% of African American subjects[14] interviewed at

[11]Students were considered ineligible if they moved out of the Rochester school district before the wave 1 cases were fielded, if neither English nor Spanish was spoken in the home, if a sibling was already in the sample pool, or if they were older than the expected age for eighth graders given the Rochester schools' admission policy.

[12]A comparison of a sociodemographic characteristics (i.e., race/ethnicity, grade, and sex) of completed and not completed cases demonstrated that the final sample did not suffer from differential rates of refusal. Unfortunately, it was not possible to examine differences in other variables such as official delinquency, history of problem behavior, or family structure for those who participated and those who did not because we could not collect such information on the latter group. See Farnworth *et al.* (1990) and Thornberry *et al.* (1993) for more complete descriptions of the Rochester Youth Development Study sampling plan.

[13]While males were oversampled at a two-to-one ratio for African American subjects (see Table I), weighting makes the sex ratio close to one-to-one, which is representative of the sampling frame from which it was drawn.

[14]By the time the ninth wave data collection was completed, 91% of the total African American subjects ($n=601$) remained in a panel.

Table I. Demographic Characteristics of African American Subjects Interviewed at Waves 1 Through 9 (Percentages)

	Wave 1	Waves 1–9		
	Total ($n=659$)	Total ($n=534$)	Male ($n=358$)	Female ($n=176$)
Age at wave 1				
11	0.2	0.2	0.3	0.0
12	13.2	14.6	15.6	12.5
13	35.1	38.2	36.3	42.0
14	39.6	37.3	37.2	37.5
15	12.0	9.7	9.7	8.0
Sex				
Male	68.4	67.0	n.a.	n.a.
Female	31.6	33.0	n.a.	n.a.
Grade at wave 1				
7th grade	55.2	58.6	62.6	50.6
8th grade	44.8	41.4	37.4	49.4
Census tracts grouped by resident arrest rates (RAR)				
1 = highest RAR	39.2	38.8	34.4	47.7
2	32.3	33.0	37.2	24.4
3	18.1	18.9	19.8	17.0
4	7.0	6.4	5.6	8.0
5 = lowest RAR	3.5	3.0	3.1	2.8

the first wave ($n=659$). Table I summarizes the demographic characteristics of those who participated in wave 1 and those who completed all nine waves of interviews ($n=534$). Respondents who completed all nine waves did not significantly deviate from the base panel in terms of its demographic characteristics (see Thornberry *et al.*'s 1993 study for a detailed discussion on the overall retention rate of the RYDS).[15]

The last two columns of Table I allow us to compare male and female subjects in terms of demographic characteristics. A difference-of-means test indicated that boys (mean age at wave 1 = 13.4) and girls (mean age at wave

[15]While the African American sample is similar to the total sample in its age and grade composition, African American subjects are more likely to be female (33.0% compared to 26.8%) and/or live in census tracts of highest arrest rates (38.8% compared to 33.7 percent). This is not surprising for two reasons. First, the majority of female subjects in the RYDS's sampling frame are of minority status. Second, African Americans tend to live in "poor" neighborhoods (e.g., areas with higher crime rates) because of their lower levels of education and income than whites (Garofalo, 1979; Skogan and Maxfield, 1981), becoming concentrated in inner-city areas (Messner and South, 1992; Wilbanks, 1985).

1 = 13.4) do not significantly differ in age. While the proportion of female subjects selected from the census tracts of the highest resident arrest rates (47.7%) is greater than that of male counterparts (34.4%), the total proportion of cases from the top two census tracts (i.e., categories 1 and 2) is almost the same for males (71.6%) and females (72.1%).

2.2. Measurement

The present study focuses on four variables: sex, age, parental supervision, and delinquency. The exact age of each student at the time of each interview is calculated based on the self-reported date of birth to enhance accuracy. When information about date of birth is missing, school records are used.[16]

Parental supervision is measured by three items: (a) how often a subject's parent knows his or her whereabouts in the course of a day; (b) how often a subject's parent knows who he or she is with when the subject is away from home; and (c) how often a subject knows how to get in touch with his or her parent when the subject is not at home. Their inter-item reliability coefficients across nine waves increase from 0.39 to 0.68.[17] In order to maintain consistency in measurement the same items are used for all waves.

A total of 48 delinquency items were included in the interview schedule. The items are derived in large part from the National Youth Survey (Elliott *et al.*, 1985) as modified by the Denver Youth Survey (Huizinga *et al.*, 1991). They range in seriousness from running away from home to using a weapon to hurt someone. Of these, thirty nine items are used for the present analysis. These are grouped into four offense categories: public disorder offenses, property offenses, personal offenses, and drug use (see Table II). Affirmative answers to the questions about the subject's delinquent involvement over the previous six-month period were screened to determine whether they fit the type of delinquency measured by the items and are "actionable" offenses. The latter criterion is intended to screen out trivial offenses (e.g., siblings'

[16]Race/ethnicity and social class, which became almost standard sociodemographic control variables, are not included in the present analysis for the following reasons. First, since the present sample includes only African American subjects, ethnicity is no longer a variable. Secondly, a subject's social class was measured by a caretaker's education, specifically, years of formal schooling, but the measure was not significantly related to either sex or delinquency and, thus, it is not worth statistically controlling it (Jang, 1992). In addition, two variables of family structure, father absence and number of children living in a same household, were examined, but again neither of them were significantly correlated with both sex and delinquency. So these variables are not controlled in the present analysis.

[17]The reliability coefficients of nine waves are: 0.46 (wave 1), 0.39 (wave 2), 0.49 (wave 3), 0.56 (wave 4), 0.53 (wave 5), 0.66 (wave 6), 0.68 (wave 7), 0.67 (wave 8), and 0.64 (wave 9).

Table II. List of Delinquency Items by Offense Types

Public disorder offenses (7 items)	Personal offenses (8 items)
Hitch-hiking with strangers[b]	Carrying a hidden weapon
Public rowdiness	Hitting someone
Begging from strangers[b]	Throwing objects at people
Public drunkenness	Attack with weapon
Obscene telephone calls[ab]	Gang fights
Joyriding	Robbery
Vandalism	Sexual assault[a]
	Rape[ab]
Property offenses (12 items)	Drug use (12 items)
Avoid paying for things[b]	Alcohol: beer/wine
Forgery/fake money	Alcohol: hard liquor
Illegal credit/bank card use	Marijuana
Fraud[b]	Inhale things
Buying/selling stolen goods	Acid, LSD, psychedelics or hallucinogens
Theft <$5	Cocaine or coke
Theft $5 – 50	Crack
Theft $50 – 100	Heroin
Theft >$100	Angel dust or PCP
Breaking and entering	Tranquilizers
Motor vehicle theft	Downers or barbiturates
Arson	Uppers, speed or amphetamines

[a]Not included in wave 1 interview.
[b]Not included in waves 8 and 9 interveiw.

squabbles with one another in response to a question about serious assault) that law enforcement officials would, in all probability, ignore.[18] If the response meets these two criteria, the total number of incidences reported is used to construct a summated delinquency index for each of the four offense types. Thus, a respondent who reports no involvement in a certain delinquent act is assigned the value of zero for the delinquency item. Since almost all the incidence rates of delinquency are highly positively skewed, the rates are transformed into their natural logarithmic value.[19]

[18]To determine that the offenses reported are "actionable," respondents are asked to describe the most serious act committed in a category and to answer a number of follow-up questions about it. Coders use this information to rate the act as being actionable or not. The interrater reliability ranges from 90% to 95% (Krohn *et al.*, 1992). If the most serious delinquency described is not rated as delinquent, the item is coded as zero (i.e., no delinquency committed).

[19]The logarithmic transformation is also consistent with our assumption concerning qualitative differences in a unit interval. Specifically, it is assumed here that a difference between 156 and 157 delinquent acts is not qualitatively the same as a diference between 0 and 1 delinquent acts over a six-month period. Similarly, a difference between 155 and 160 is not the same as a difference between 5 and 10. Similar data transformation is often adopted for other variables like population size (e.g., Jang and Alba, 1992).

The present study conceptualizes delinquency as a common, underlying, and unobservable propensity to commit delinquent acts (Sampson, 1985). Since empirical evidence suggests that delinquency is a multi-dimensional latent construct (Thornberry, 1989), it is best measured by its behavioral manifestations of various overt acts. A measurement model of delinquency is constructed, where several types of offenses are hypothesized as indicators of the theoretical construct. In other words, this study models adolescents' reports of involvement in those different types of offenses as linear functions of a common, underlying, and unobservable delinquent propensity.

2.3. Model Estimation

Sex differences in delinquency at each wave is modeled as the direct effect of sex on delinquency, and is measured by an unstandardized regression coefficient associated with the sex-delinquency relationship. The age variable at each wave is controlled to remove any possible source of spuriousness since it is consistently correlated with delinquency, though not with the sex variable. Once all the coefficient are estimated over nine points in time (i.e., nine waves), they are compared with each other, and the coefficient is regressed upon mean age at each wave to see if there exists any statistically significant trend over the age period and, if so, what functional form it has.

The parental supervision construct is introduced into the initial model as an intervening variable between sex and delinquency. This enables us to test whether parental supervision accounts for sex differences in delinquency as we hypothesized, and whether its explanatory ability varies at different ages.

The primary method to estimate models is structural equation modeling (Bentler, 1980; Bollen, 1989; Loehlin, 1987), which allows us to examine the relationships among latent variables that are not influenced by measurement errors (Newcomb and Bentler, 1988). Among the available computer programs for this type of modeling, we use the EQS program (Bentler, 1989) to estimate equations. A covariance matrix is analyzed to estimate models.

3. RESULTS

3.1 Univariate Analysis

Table III reports descriptive statistics of delinquency measures separately for the total, male, and female subjects.[20] Over the observed age period

[20]We report means and standard deviations of logarithm-transformed rather than raw scores of delinquency measures because the former, not the latter, are directly incorporated into the construction of covariance matrices for the present analysis.

(i.e., 13.3 through 17.3 years of average age) involvement in public disorder and property offenses for all subjects tends to decline with some fluctuation due to random variation or random measurement errors. The pattern for personal offenses is similar to public disorder and property offenses through wave 6, after which involvement increases. Respondents' drug use steadily increases over the age period, reaching the highest level at the last wave. This increasing pattern for drug use is similar to what Elliott *et al.* (1989) find using data from the National Youth Survey.

The age when the levels of non-drug offenses peak is younger than what previous research has found. Previous studies, whether they are based on self-report or official data, tend to report that a youth's delinquency reaches its peak during middle adolescence, typically ages 15 through 17, and thereafter decreases (Elliott *et al.*, 1989; Farrington, 1986; Gottfredson and Hirschi, 1990; Hirschi, 1969; LaGrange and White, 1985; Monahan, 1960; Thornberry, 1987; but see Gold, 1970).[21] The present study finds that involvement in public disorder, property, and personal offenses is highest when the subjects are, on average, 14 years old. We attribute this earlier peak to the fact that the present study is based solely on non-white adolescents who tend to reach the peak of delinquent activities at an earlier age than white adolescents (Hirschi and Gottfredson, 1983).

The developmental patterns of delinquent involvement for boys and girls are similar to those for the total sample. As anticipated, male delinquency is consistently higher than female delinquency over the age period with some exceptions at primarily earlier waves when girls show higher mean levels of involvement in public disorder offenses and drug use (see Table III). But, only two of the exceptions are statistically significant (specifically, drug use at waves 1 and 2) according to partial correlation analysis which we now turn to.

3.2. Partial Correlation Analysis

The first step in the analysis is to compute first-order partial correlations between sex (male) and delinquency indicators holding the mean age at each wave constant to see if similar patterns of sex differences are observed across different types of offenses (see the bottom panel of Table III). An examination of statistically significant partial correlations over time reveals that the pattern for public disorder, property and personal offenses is similar showing a curvilinear turned with a peak at wave 5. On the other hand, for drug

[21] In his self-report study, Gold (1970) finds patterns partly similar to what the present study finds. On the other hand, Elliott *et al.* (1989, p. 91) also find a somewhat similar pattern for "index offenses" when they use "general offending rate," but they report that "prevalence rate" of "index offenses" peaks at ages 15–17.

Table III. Means and Standard Deviations of the Log of the Incidence of Self-Reported Delinquency and Partial Correlations between Sex and Delinquency Across Waves 1 to 9

	Wave 1	Wave 2	Wave 3	Wave 4	Wave 5	Wave 6	Wave 7	Wave 8	Wave 9
Mean age	13.3	13.9	14.3	14.9	15.3	15.9	16.3	16.9	17.3
Total sample ($n=534$)									
Public disorder	0.23(0.69)[a]	0.31 (0.69)	0.22(0.69)	0.18(0.56)	0.14(0.50)	0.13(0.48)	0.10(0.52)	0.12(0.46)	0.08(0.36)
Property	0.17(0.55)	0.22(0.54)	0.16(0.48)	0.13(0.42)	0.12(0.44)	0.12(0.40)	0.06(0.38)	0.07(0.34)	0.05(0.32)
Personal	0.56(0.98)	0.66(0.93)	0.63(1.14)	0.51(1.12)	0.46(1.08)	0.35(0.92)	0.41(1.04)	0.55(1.21)	0.48(1.28)
Drug	0.31(0.81)	0.50(1.07)	0.40(0.88)	0.52(1.04)	0.49(0.98)	0.62(1.06)	0.65(1.17)	0.75(1.28)	0.83(1.36)
Male sample ($n=358$)									
Public disorder	0.19(0.56)	0.27(0.67)	0.30(0.80)	0.23(0.65)	0.23(0.68)	0.21(0.64)	0.12(0.52)	0.20(0.61)	0.09(0.41)
Property	0.22(0.64)	0.28(0.62)	0.26(0.63)	0.19(0.53)	0.23(0.61)	0.16(0.48)	0.14(0.57)	0.11(0.47)	0.04(0.27)
Personal	0.69(1.08)	0.68(0.96)	0.71(1.22)	0.63(1.20)	0.62(1.15)	0.50(1.03)	0.48(1.08)	0.64(1.26)	0.50(1.22)
Drug	0.20(0.64)	0.43(1.01)	0.36(0.92)	0.54(1.19)	0.63(1.28)	0.86(1.31)	0.76(1.37)	0.99(1.48)	1.06(1.62)
Female sample ($n=176$)									
Public disorder	0.26(0.77)	0.34(0.71)	0.17(0.60)	0.14(0.48)	0.08(0.29)	0.07(0.31)	0.08(0.51)	0.07(0.30)	0.07(0.33)
Property	0.13(0.47)	0.17(0.47)	0.10(0.33)	0.09(0.32)	0.05(0.23)	0.09(0.32)	0.01(0.09)	0.03(0.19)	0.06(0.36)
Personal	0.46(0.89)	0.64(0.91)	0.57(1.07)	0.42(1.05)	0.34(1.01)	0.24(0.82)	0.36(1.01)	0.49(1.18)	0.47(1.33)
Drug	0.39(0.90)	0.55(1.10)	0.43(0.84)	0.50(0.92)	0.40(0.67)	0.44(0.79)	0.58(1.00)	0.60(1.09)	0.66(1.12)
Partial correlations[b]									
Public disorder	−0.04	−0.05	0.10**	0.08*	0.14**	0.13**	0.03	0.14**	0.02
Property	0.08*	0.10**	0.16**	0.11	0.20**	0.08*	0.15**	0.11**	−0.04
Personal	0.11**	0.01	0.06*	0.08*	0.12**	0.12**	0.05	0.06*	0.01
Drug	−12+	−0.08+	−0.04	0.01	0.11**	0.18**	0.07*	0.14**	0.14**

[a]Values in parentheses indicate standard deviations.

[b]Negative correlation means greater female delinquency, whereas positive correlation shows greater male delinquency.

*$p<0.05$ (one-tailed test).

**$p<0.01$ (one-tailed test).

+$p<0.05$ (two-tailed test).

offenses, the pattern of partial correlations differs, remaining at about the same level from waves 5 through 9 during which sex differences are statistically significant in the expected direction (i.e., greater involvements in drug use among boys than girls). This dissimilarity between drug and non-drug offenses in the shape of the age-delinquency curve is, in fact, consistent with previous research findings (Farrington, 1986; Steffensmeier *et al.*, 1989; Warr, 1993), confirming the desirability of analyzing non-drug delinquency separately from drug use behavior. Based on this observation, we decided to focus on the latent-variable model of sex differences in delinquency using only the three non-drug offenses as indicators of delinquency. Thus, we report and discuss here only the results from the three-indicator model estimation.[22]

3.3. Covariance Structure Analysis

The next stage of data analysis estimates structure coefficients between sex and delinquency across nine waves. This analysis will enable us to see how sex differences in delinquency behave over time when we look at all the delinquency indicators together rather than separately. Results from the model estimation using the three non-drug offenses are summarized in Table IV.

3.3.1. Overall Model Fit

The top panel provides information about the overall goodness-of-fit of the model, for which four fit measures are reported: (a) the likelihood ratio *chi-square* test statistic; (b) one incremental fit index, Bentler and Bonett's (1980) Normed Fit Index (NFI); and (c) two nonincremental fit indexes, Steiger's (1990) Root Mean Square Error of Approximation (RMSEA) and Joreskog and Sorbom's (1989) Goodness of Fit Index (GFI).[23] Only four of nine *chi-square* statistics turned out to be nonsignificant at the conventional level of 0.05, which seems to reflect the present

[22]While the three-indicator model generated better results than its four-indicator counterpart in terms of model fitting (i.e., explained variance) and the clarity of a longitudinal trend as expected, the overall results were not substantially different from each other.

[23]It is known that the *chi-square* statistic is not an ideal measure of model fit especially when a given sample is "large" because it is a linear function of sample size and, thus, very sensitive to minor discrepancies between model and data. So we report two other types of fit measures to properly assess overall model fit. First, Bentler and Bonett's NFI, which focuses on the proportion of the sample covariations explained by a hypothesized model, starting with a null model. Secondly, we also report two nonincremental fit indexes, Steiger's RMSEA and Joreskog and Sorbom's GFI because a recent study shows that incremental fit indexes including the NFI are very unstable across estimation methods (Sugawara and MacCallum, 1993).

Table IV. Covariance Structure Analysis Results from Examining the Relationship between Sex and Incidence of Self-Reported Delinquency Across Waves 1 Through 9

	Wave 1	Wave 2	Wave 3	Wave 4	Wave 5	Wave 6	Wave 7	Wave 8	Wave 9
Measures of model fit									
Chi-square[a]	9.47	21.12	9.22	11.29	14.08	14.80	22.73	3.19	4.28
p-value	0.050	<0.001	0.055	0.023	0.007	0.005	<0.001	0.525	0.368
Bentler and Bonett's NFI	0.95	0.93	0.97	0.94	0.93	0.90	0.84	0.96	0.89
Steiger's RMSEA	0.00	0.07	0.08	0.04	0.05	0.03	0.07	0.06	0.02
Joreskog and Sorbom's GFI	0.99	0.96	0.95	0.98	0.97	0.98	0.97	0.97	0.98
Factor loadings									
Public disorder offenses	0.43f	0.72f	0.84f	0.73f	0.67f	0.65f	0.64f	0.42f	0.50f
Property offenses	0.67**	0.69**	0.57**	0.44**	0.59**	0.47**	0.46**	0.57**	0.34**
Personal offenses	0.66**	0.59**	0.61**	0.55**	0.46**	0.44**	0.48**	0.42**	0.33**
Effect of sex (male) on delinquency[b]									
Without parental supervision	0.06**	0.03	0.16**	0.11**	0.18**	0.13**	0.08*	0.08*	0.00
With parental supervision controlled	0.01	−0.01	0.02	0.05	0.11**	0.14**	0.09**	0.12**	0.01
Effect of sex (male) on supervision[b]	−0.10**	−0.20**	−0.15**	−0.16**	−0.20**	−0.14**	−0.12**	−0.20**	−0.18**
Effect of supervision on delinquency[b]	−0.54**	−0.26**	−0.59**	−0.33**	−0.38**	−0.13*	−0.09	−0.10	−0.04

Note. $n = 534$ (male = 358; female = 176); f = fixed coefficient.

[a]Degrees of freedom associated with the *chi-square* statistic is 4 for all waves.

[b]All effects are measured by unstandardized regression coefficients.

*$p < 0.05$ (one-tailed test).

**$p < 0.01$ (one-tailed test).

sample size more than the true state of the present model fit. On the other hand, seven out of nine NFI's are higher than 0.90, indicating that the present model is useful in explaining the data (Bentler and Bonett, 1980; Newcomb and Bentler, 1988; Bentler, 1989). The values of the RMSEA indicate a "close fit" (i.e., 0.05 or, less) or, at least, a "reasonable" fit (i.e., 0.08 or less) of the present model (Browne and Cudeck, 1992, p. 239), and all the GFI's are close to 1.00, ranging from 0.95 to 0.99. Thus, the present results merit close attention.

3.3.2. Measurement Model

The second panel shows the factor loadings of the delinquency indicators. Most of the loadings are high in the 0.40 through 0.80 range with minor exceptions at wave 9, indicating that all three offense-type indexes are good indicators of the common factor of delinquency. The rank-order of the coefficients in terms of magnitude change across waves, revealing inconstancy of the relationships among the indicators over time. This inconstancy shows the importance and the necessity of simultaneously incorporating different types of delinquent acts into a measure of delinquency instead of constructing an omnibus measure of so-called general delinquency which often obscures meaningful variations observed at lower levels like individual-item or offense-type level (Hindelang *et al.*, 1979; see Jang, 1992 for related findings).

3.3.3. Structural Model I: Sex-Delinquency Relationship

The next panel reports two sets of findings about the effect of sex on delinquency (i.e., sex differences in delinquency) over the age period: first, without parental supervision in the model, and then including it as an explanatory variable of the sex-delinquency relationship. We begin with the first set. The unstandardized regression coefficients show that sex differences in delinquency tend to fluctuate over time increasing between waves 1 and 5 and thereafter decreasing. This curvilinear pattern reflects a variant, rather than an invariant, pattern of sex differences over the observed period of adolescence. The nine unstandardized structural coefficients are also compared among themselves to see whether differences in coefficients are statistically significant (see Table V).[24] The comparison of the eight pairs of

[24]Since standard error estimates of the structural ceofficients are computed by EQS, *t*-statistics are calculated and used to determine levels of statistical significance of differences in coefficients. The formula used to calculate a *t*-statistic for the comparison between coefficients 1 and 2 is $(B_1 - B_2)/([SE_1^* DF_1 + SE_2^* DF_2]/[DF_1 + DF_2])^{1/2}$, where B = unstandardized coefficients, SE = standard error estimate of structural coefficient, and DF = degrees of freedom for the sample (i.e., $n - 1 = 533$).

Table V. Student's *t* Statistics for Differences in the Effects of Sex on Incidence of Self-Reported Delinquency Across Waves 1 Through 9

	Wave 1	Wave 2	Wave 3	Wave 4	Wave 5	Wave 6	Wave 7	Wave 8	Wave 9
Wave 1	—								
Wave 2	−0.82	—							
Wave 3	1.99*	2.36**	—						
Wave 4	1.14	1.66*	−0.94	—					
Wave 5	3.29**	3.35**	0.47	1.73*	—				
Wave 6	2.01*	2.35**	−0.47	0.62	−1.22	—			
Wave 7	0.59	1.24	−1.47	−0.56	−2.48**	−1.29	—		
Wave 8	0.70	1.37	−1.59	−0.62	−2.86**	−2.49	0.00	—	
Wave 9	−2.00*	−0.57	−3.42**	−2.85**	−5.39**	−4.02**	−2.42**	−2.98**	—

Note. $n = 534$ (male = 358; female = 176).
*$p < 0.05$ (one-tailed test).
**$p < 0.01$ (one-tailed test).

adjacent waves (i.e., waves 1 and 2, waves 2 and 3, etc.) is consistent with the observation above that the change in sex differences in delinquency follows a curvilinear pattern.

3.3.4. Modeling the Pattern of Sex Differences: Nonlinear Regression Analysis

However, the observed pattern of sex differences in delinquency needs to be statistically confirmed by examining whether a quadratic model fits the observed data. For this analysis, a quadratic regression equation was estimated by regressing sex differences in delinquency (Y) on the mean age variable (X) and its squared term (X^2).[25] The resulting equation is:

$$Y = -0.17X - 0.77X^2 \quad (1)$$

The coefficient of the squared mean age variable in the quadratic equation is significant at the 0.05 level (one-tailed test), indicating that the observed non-linear trend is statistically significant, while its linear term (i.e., X) failed to reach statistical significance. In addition, 60% of the total variance in the dependent variable is explained by the quadratic term (i.e., X^2), which is about 97% of the variance explained by the regression equation ($R^2 = 0.62$).

[25]Hierarchical analysis (Cohen and Cohen, 1983) was used to estimate the regression equation. That is, first, the structural coefficient that measures the sex differences in delinquency was regressed on the variable of mean age at each wave for a linear model, and then the squared mean age variable was added to the initial equation for a quadratic model. To avoid the collinearity problem due to the practically perfect correlation between the mean age variable and its squared term ($r = 0.999$), the mean age variable was "centered" on its mean (15.3) before the squared term was constructed (Cohen and Cohen, 1983). In addition, the regression equation is presented in standardized coefficient given the limited meaning attached to the original metric of the independent variables.

Thus the above results from the regression analysis demonstrate that sex differences in delinquency vary rather than remain constant over the observed age period, following the concave downward curve where the value of sex differences in delinquency reaches the highest level when the subjects are, on an average, about 15 years old.

3.3.5. Sex Differences in Delinquency: Participation or Frequency of Offending?

Before we examine whether parental supervision explains the sex-delinquency relationship, it is worthwhile to discuss in detail the nature of sex differences in delinquency we observe in this study. More specifically, the question arises as to whether the present study's incidence-based sex differences and their changes over time are due to differences and changes in the proportion of subjects who participated in delinquent activities (i.e., prevalence) or the number of offenses by active delinquents (i.e., frequency). To address this issue, we repeated the whole set of analyses described above using the prevalence and the frequency measure of delinquency.[26]

Partial correlation analysis results (not presented in a table) revealed that the pattern of incidence-based sex differences is more similar to that of prevalence—rather than frequency-based differences. Specifically, significantly few differences are observed between boys and girls when the frequency measure is used as compared to the incidence measure. This finding is very consistent with previous studies which attribute sex differences in aggregate rates of delinquency primarily to differences in participation rather than frequency of offending rates (Blumstein *et al.*, 1986; Fagan, 1990; Weiner, 1989). In other words, boys are, on average, more delinquent than girls not so much because active male delinquents always exceed female counterparts in offending but because a larger proportion of boys than girls participate in illegal acts. This implies that factors which either increase or decrease opportunities for delinquency (e.g., parental supervision) have a lot to do with the explanations of incidence-based differences between boys and girls.

To further investigate the similarities, we regressed the prevalence-based sex differences in delinquency (Y) on the mean age variable (X) and its squared term (X^2) as we did for the incidence-based differences (see Eq. 1).

[26]We could not estimate the latent-variable structural equation model for the frequency measure because the number of valid cases (i.e., active delinquents) varies across delinquency indicators and across waves, ranging from 16 to 227, which leaves too small number of valid observations to conduct such analysis.

The resulting equation is

$$Y = 0.02X - 0.61X^2 \quad (2)$$

Eq. (2) shows that a longitudinal pattern of prevalence-based sex differences in delinquency is similar to that of incidence-based differences, even though the inverted U-shaped curve is less peaked for prevalence as compared to incidence measure of delinquency. The linear term of the mean age variable is not statistically significant as was the case in Eq. (1), whereas its squared term is significant (one-tailed p-value $= 0.052$) at the level of 0.10 (one-tailed test),[27] explaining 38% of the total variance in prevalence-based sex differences in delinquency. In sum, these findings are consistent with the observation that the pattern of sex differences in delinquency for incidence rates more closely reflects the patterns for prevalence estimates than frequency rates.

3.3.6. Structural Model II: Does Supervision Explain Sex-Delinquency Relationship?

We now turn to examine whether parental supervision explains sex differences in delinquency and whether the explanatory ability changes over time. Results show that parental supervision significantly explains sex differences in delinquency between waves 1 and 5, but fails to do so for the remaining waves (see the second row of the third panel of Table IV).[28] A close examination of the last two panels of Table IV reveals that the inability of parental supervision for later waves (when our subjects are, on average, 16 and 17 years old) seems to have to do with the declining effect of parental supervision on delinquency rather than any systematic changes in sex differences in parental supervision. Specifically, the negative sex (male)-supervision coefficient (i.e., boys are less supervised by their parents than girls) remains statistically significant throughout nine waves. On the other hand, the supervision-delinquency coefficient significantly drops in magnitude between waves 5 and 6, from -0.38 ($p < 0.01$, one-tailed test) to -0.13 ($p < 0.05$, one tailed test), and becomes non-significant for waves 7 through 9.

[27]Given such a small number of data points (i.e., nine), we think it is legitimate and fair to consider a somewhat relaxed level of statistical significance in interpreting the regression results.

[28]While the sex-delinquency coefficient at wave 5 still remains significant even after the inclusion of parental supervision (i.e., 0.11, $p < 0.05$), the reduction, that is, the difference between 0.18 and 0.11 is statistically significant ($t = 1.79$, $p < 0.05$, one-tailed test). On the other hand, slight increases in the coefficients at waves 6 through 9 as a result of controlling for parental supervision are all statistically non-significant.

In sum, parental supervision significantly accounts for sex differences in delinquency during early through some part of middle adolescence (i.e., ages 13 through 15, on average), but the ability of parental supervision in explaining the sex-delinquency relationship is not significant thereafter. This declining salience of parental influence upon adolescents' behaviors through close monitoring is consistent with what previous studies tend to suggest (Agnew, 1985; Elliott *et al.*, 1985; Greenberg, 1981; Jang, 1992; LaGrange and White, 1985; Loeber and Le Blanc, 1990; Thornberry, 1987).

4. DISCUSSION AND CONCLUSIONS

Hirschi and Gottfredson (1983; Gottfredson and Hirschi, 1990) argue that the age-crime relationship is "sufficiently invariant" across not only time and place but also different social groups. Their position is controversial and has stirred much debate. In part, this debate has been generated by the different interpretations of similar data. The differences observed in the age-crime relationship are given primary importance by Blumstein *et al.* (1988b, pp. 63–64), as they suggest that "such difference is crucial to pursuing the social, cultural, economic, psychological, environmental, and other factors that might account for differences in the age-crime relationship among different subgroups." Gottfredson and Hirschi (1988, p. 49) view those same differences as "the statistical noise generated by atheoretical research."

The controversy is also fueled by the implications that Gottfredson and Hirschi (1990) derive from their position. They suggest that the invariance in the age-crime relationship calls into question common critiques of theories, the career criminal research, and the need for longitudinal designs (Hirschi and Gottfredson, 1983). Clearly, the issue needs to be resolved (Tittle, 1988).

The present study responds to a call for more empirical research on the age-crime relation by examining the sex-invariance hypothesis. The overall findings do not support Gottfredson and Hirschi's position. The gap between boys and girls in terms of delinquent activities varies over time, following the pattern of a concave downward curve. Specifically, the sex differentials increase between the age of 13 and 15, and decrease between the age of 15 and 17 for public disorder, property and personal crimes. This trend somewhat parallels what Farrington (1986) finds in his examination of the longitudinal pattern of sex ratios based on official data, even though we observe the point of maximum at an earlier age.

Hirschi and Gottfredson (1983, 1985; Gottfredson and Hirschi, 1990) argue that the age effect on crime is direct and, thus, theoretical variables explaining crime-rate differences are likely to fail to explain the effect. On

the other hand, Greenberg (1981, 1985) and Blumstein *et al.* (1988a, b) argue that the effects of age are not entirely direct and can be explained by theories like social control, strain, and differential association theory (see also Farrington 1986). Similarly, Tittle (1988) illustrates how well-known theoretical perspectives (e.g., the social control and the labeling perspective) might be capable of explaining the age-crime phenomenon and Hagan and Palloni (1988) emphasize a potential contribution of the life-course perspective to the age-crime debate.

To examine whether theoretical explanations could account for the sex-crime relationship at different ages, we focused on parental supervision. We found that supervision does explain the relationship between sex and delinquency for the early teenage years but not the later ones. Supervision is effective in the early adolescent years because adolescents have not yet reached the age at which they assert their independence. Because parents are typically more vigilant in controlling the behavior of their daughters than that of their sons, males commit more delinquent behavior. As children enter later adolescence, the ability of parents to supervise the activities of either sons or daughters decreases. At these ages, youth can drive or have friends who drive. They are also likely to be engaged in more activities that require being away from the home and neighborhood. Most importantly, these changes affect both males and females. Thus, the discrepancy in the rates of offending between males and females narrows since parents are no more likely to effectively supervise offspring of either sex.

While the present study's focus on African American adolescents makes a contribution to the study of delinquency given the paucity of research on delinquent behaviors among ethnic minorities (e.g., Loeber and Stouthamer-Loeber, 1986), we at the same time acknowledge that our discussion is limited due to the lack of other ethnic samples to compare. Some studies have shown that the difference in rates of offending for males and females is less for African Americans than it is for white adolescents (Girodano and Cernkovich, 1979; Datesman and Scarpitti, 1980a; Hindelang *et al.*, 1981; Jensen and Eve, 1976; Smith and Visher, 1980). One might expect that parental supervision would not be as effective in explaining the sex-crime relationship for whites as it is for African Americans. On the other hand, we also learn from some of prior research that African Americans are, on the whole, less supervised by their parents than are whites and thus become more independent and self-reliant (Datesman and Scarpitti, 1980b; Giordano, 1978; Jensen and Thompson, 1990). African American parents are also less likely to differentiate between daughters and sons in terms of supervision efforts (Staples, 1978; Taylor *et al.*, 1991). In this respect, our focus on African Americans represents a conservative test of the effect of supervision.

In families where supervision plays a more important role, we might expect that it would have an even greater effect than it did for African American adolescents.

The present research has underscored the need for studies that explain the variations in the ratio of male to female rates of offending. Our results indicate that there are variations in the age-crime relationship for males and females. We have also identified parental supervision as being a factor in generating the difference observed across age groups. We join with Tittle (1988) in suggesting that "such explanation ought to be the main goal of criminological work bearing on the age/crime phenomenon." Our future research interest resides in examining the validity of theoretical explanations such as the supervision thesis that have the potential of accounting for the development patterns of sex differences in delinquency observed in the present study.

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