Relative Influences of Perceived Parental Monitoring and Perceived Peer Involvement on Adolescent Risk Behaviors: An Analysis of Six Cross-sectional Data Sets

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**Purpose:** To assess: (a) the relative impact of monitoring and peer involvement among six cohorts of African-American youth in their mid-adolescent years, over a decade of research in one urban area, and (b) the consistency of the impact of the two influences over time.

**Methods:** Baseline data were collected from six cohorts involving 1279 low income African-American youth aged 13 to 16 years involved in community based studies conducted over a decade in an urban area. Self-reported behaviors, and perceptions of parental monitoring and peer risk-involvement were assessed through structured questions. Data were analyzed by frequency distribution, one-way ANOVA, and multiple logistic regression.

**Results:** There was a rapid increase in sexual activity and substance use behaviors during mid-adolescence. Monitoring had a protective influence on substance use behaviors and sexual activity, but had no impact on condom use or drug trafficking. Peer involvement influenced all evaluated risk behaviors. The influences overall did not statistically change over time.

**Conclusions:** Despite the marked increase in risk behaviors during mid-adolescence, monitoring and peer involvement both influenced adolescent behaviors across each cohort. © Society for Adolescent Medicine, 2003

KEY WORDS:
Adolescent risk behavior
Gender differences
Parental monitoring
Peer influence

The participation of young people in risk behaviors has been a source of concern to parents and adolescent health care providers worldwide. One nationwide survey of adolescent risk behaviors demonstrated that in the thirty days prior to being surveyed, over one-half of American high school students had consumed alcohol; more than one-quarter had used marijuana; one-third had smoked cigarettes; and over one-half had engaged in sex, half of those admitting to not having used a condom at last contact [1].

Among the theoretical frameworks from which adolescent problem behavior has been examined, Jessor’s Theory of Problem Prone Behavior conceptualizes a system of psychosocial risk factors that relate to the development of a syndrome of problem behaviors in adolescence [2]. While some adolescents become involved in multiple risk behaviors with likelihood increasing with age, they tend to be involved consecutively rather than simultaneously [3]. Thus there is a need for interventions which impact over a range of behaviors and the span of adoles-
venile. At the same time there is some evidence that the mid-adolescent years may be especially critical years with regard to risk adoption. For example, a study on sexual behaviors reported that 33% of 13-year-old girls were sexually active compared to 75% of 15-year-old girls, and 45% of 13-year-old boys were sexually active compared to 95% of 15-year-old boys [4]. Other studies have demonstrated marked increases in risk behavior acquisition between 7th–8th grade and 9th–12th grade, including a four-fold increase in cigarette smoking rates and alcohol use increasing from 22.7% to 42.7% [5,6]. In another report, 1 in 12 adolescents aged 12–13 years engaged in two or more risk behaviors compared to one-third of 14–17-year-olds doing so [3]. Nevertheless, most data sets have been of insufficient size to allow focus on these critical years.

The success of parental involvement as a deterrent against adolescent high-risk activities has been illustrated repeatedly [5,7–9]. Multiple aspects of parental influence have been studied and found to be protective. Three styles of parenting have been described: “Permissive” parents try to be nonpunitive and accepting of the desires and actions of their children; “Authoritarian” parents try to mold, assess and control behavior and attitudes with an emphasis on the virtue of obedience and the use of forceful punitive measures; and “Authoritative” parents emphasize limit-setting and supervision combined with affection, acceptance, and involvement [10]. Although both authoritarian and authoritative parenting involves monitoring, the authoritative parenting style specifically has been shown to be inversely related to children’s smoking behaviors [11] and to facilitate academic success in adolescents [12]. Adolescent girls who reported “less parental support” were more likely to be involved in substance use behaviors [13].

Dittus and Jaccard found that adolescents who perceived maternal disapproval of involvement in sexual risk behaviors and were satisfied with their relationship with their mother were less prone to become pregnant or initiate sexual activity [14]. In general, parental involvement that incorporates interaction with the child, monitoring of the child, and concern for the child, is protective against adolescent risk involvement [7].

Increased parental monitoring is associated with later onset of sexual initiation [4]; the reverse also holds true as decreasing levels of monitoring are directly associated with increasing involvement in risky sexual behavior [15]. Although “monitoring” is variably defined in the literature, supervision, parent–child communication and parental knowledge of children’s whereabouts are all-important components of effective parental monitoring [8,9,16]. Adolescents lacking after-school supervision have increased substance use and risk-taking; conversely, children of parents who “usually” knew the whereabouts of the adolescents are less likely to have such involvement [17]. Parental communication has positive effects on condom use [4]. Adolescents’ perceptions of their parents’ knowledge of where they are and with whom they are, are felt to be key factors in the success of parental monitoring [18].

The finding that peer involvement in risk behaviors has a strong influence on the likelihood of teen risk-taking is well-described in the research literature [7]. In one study, the most powerful influence on high-risk sexual behaviors was perceived peer activity [15]. Other researchers have shown that increased perception of peer involvement in risky sexual behavior is correlated with higher rates of involvement in [13], and initiation of sexual risk behaviors [19]. Prinstein et al found that adolescents’ substance use and violence were related to perceived peers’ substance use and deviance [20].

There are some reports of the relative influence of parental factors and peer involvement on youth risk behaviors. Beal et al found that in their population of younger adolescents, peers and their behavior were better predictors of youth risk behavior than “parent social influences” (which included elements of modeling, monitoring, and disapproval) [21]. Parent–adolescent relationships can affect adolescent’s drinking but the degree of effect is decreased as peer drinking increases [22].

Boys who are involved in substance use behaviors are thought to be most influenced by peers; girls, however, are influenced by peers and parents [23].

Although a predominance of the earlier parental monitoring research was conducted among white middle class families, recent work in low-income African-American families has confirmed a strong inverse correlation between perceived parental monitoring and adolescent risk behavior both cross-sectionally [8,9,18,23], and longitudinally [8,24]. There is also literature supporting the strong peer influence on substance abuse and sexual risk behaviors in this ethnic group [24,25]. It is important to assess the consistency of these phenomena across time and cohorts. Blum et al have demonstrated varying levels of risk behavior within demographically similar groups [6], which emphasizes the need for more research on ethnically and socioeconomically comparable adolescents.
Accordingly, the current study was designed to: (a) assess the relative impact of perceived parental monitoring and perceived peer involvement among six cohorts of African-American youth in their mid-adolescent years, over the course of a decade of research from one urban area, and (b) examine the homogeneity of the association of adolescent risk involvement with perceived parental monitoring and perceived peer involvement across the six cohorts.

Methods

Data Sets

The data were collected from six cohorts of low-income, predominantly African-American adolescents involved in six community-based risk-reduction or risk-assessment studies conducted over a decade in an eastern urban area. Owing to the overwhelming majority of African-American youth in the six cohorts, sub-analyses of ethnic groups were not possible. The recruitment procedures for all but the sixth cohort have been described in detail elsewhere [4,8,16,25–27].

The first cohort was 455 African-American youth aged 9 through 15 years, participating in a cross-sectional survey assessing AIDS related and other risk behaviors. The participants were recruited from six public housing communities in 1992 (cross-section 92) [26].

The second data set was baseline information obtained in 1993 from 383 African-American youth aged 9 through 15 years, identified from nine recreation centers associated with three public housing communities [8]. The participants were enrolled in a longitudinal evaluation of an HIV risk-reduction intervention Focus on Kids (FOK) baseline [28,29].

The third cohort was 355 African-American youth aged 9 through 17 years, participating in a cross-sectional survey assessing parental influences on sexual risk behaviors. The participants were recruited from eight public housing communities in 1994 (cross-section 94) [4].

The fourth cohort was 348 African-American youth aged 9 through 15 years, who were enrolled in a violence prevention study (Neighborhoods in Action [NIA]) conducted in 1996. They were recruited from ten public housing communities; the baseline data were used in the current study [27].

The fifth cohort was 246 African-American youth, aged 12 through 16 years involved in a longitudinal, randomized, controlled evaluation of a parental monitoring and supervision intervention (ImPact). The participants were recruited from eight public housing communities and this study uses baseline data collected in 1997 [16].

The sixth group consisted of 832 African-American youth (aged 13 through 16 years) enrolled along with their parents in a controlled, randomized longitudinal trial. The youth were recruited from 35 sites (e.g. recreation centers, churches, community centers, individuals who opened their home to community youth) in Baltimore. This study uses baseline data collected in 1999 (Focus on Teens [FOT] baseline). (Further details regarding recruitment are available from the authors).

For the purpose of data analysis in this study we selected only the children aged 13 through 16 years from within each cohort of a wider age range, as this is the mid-adolescent age span in which the transition to risk involvement appears to be particularly steep [3–6] and was common to all most of the cohorts.

Each of the six studies received Institutional Review Board approval.

Measures

Perceived parental monitoring. In all six surveys, we employed the Parental Monitoring Scale, a 6-item scale assessing youth perceptions of parental monitoring (communication and supervision) [30]. The instrument assesses the youths’ perceptions of whether his or her parent(s) usually know where the youth is, what he or she is doing and with whom he or she is interacting. Response options were 1 = “never,” 3 = “sometimes” and 5 = “always” for the 1992 and 1994 surveys, and a 5-point scale for the other four surveys (1 = “never,” 2 = “rarely,” 3 = “sometimes,” 4 = “most of the time” and 5 = “always”). A composite scale score was obtained from each individual by averaging the responses to the six items. A higher score indicates a higher level of perceived parental monitoring. The Cronbach alpha for the monitoring scale was 0.83 overall (0.69, 0.84, 0.76, 0.79, 0.77, and 0.87 for year 1992, 1993, 1994, 1996, 1997, and 1999, respectively).

Perceived peer risk–involvements. All six studies assessed perceived peer risk–involvement by asking participants how many of their friends (1 = “none,” 3 = “some” or 5 = “most”) were sexually active, used a condom, smoked cigarettes, drank alcohol, used marijuana, sold drugs or delivered drugs.

Youth risk behaviors. Youth risk behaviors during the past 6 months were assessed using youth self-report. The variables selected for this study were
those common among all or most of the six surveys. Therefore for sexual behavior, we selected the item ‘had ever had sexual intercourse’ from each survey. Condom use was measured among sexually experienced youth with a question assessing whether the subject (or partner) had used a condom the last time he or she had sex. Violence (fighting, beating), smoking cigarettes, drinking alcohol, using marijuana, selling drugs and delivering drugs during the previous 6 months were also assessed. In the 1992, 1993, 1997, and 1999 surveys, youth responded dichotomously (“yes”/“no”) for each risk activity. In the 1994 survey, the response format for risk involvement (in the past 6 months) ranged from 1 to 4 with 1 = “no,” 2 = “once or twice,” 3 = “three to 10 times” and 4 = “more than 10 times.” For the purpose of data analysis in the current study, we modified the responses from the 1994 data to “no” and “yes” = once or more during the past 6 months (the last 3 categories). In the 1996 survey, the original response format ranged from 1 to 5 with 1 = “never,” 2 = “more than a year ago,” 3 = “in the past school year,” 4 = “in the past month” and 5 = “in the past week.” For the purpose of analysis, responses were combined with 1 or 2 being “no” and 3, 4, or 5 being “yes” as during the past school year was taken to be equivalent to during the past 6 months.

Analysis

Descriptive statistics were used to analyze demographic data across the six surveys. Youth risk behavior variables were dichotomous in all the analyses done in this study. Youth risk behavior prevalence was reported using frequencies. The levels of perceived parental monitoring and perceived peer risk-involvement were evaluated by sample mean scores. Gender and age differences in youth risk behaviors were assessed by Chi-square test (Mantel–Haenszel Chi-square test for linear trend of age). Gender and age differences in perceived parental monitoring and peer risk behaviors were assessed by one-way ANOVA.

Multiple logistic regressions were conducted separately for each individual cohort to assess the relative impact of perceived peer risk-involvement and perceived parental monitoring. The perceived peer influence variable predicting each behavior was the single item of peer modeling of that specific behavior in the regression model. The analysis was subsequently repeated after combining the data from the six cohorts. The regressions were implemented by PROC LOGISTIC procedure [31] and plotting results from the regressions were carried out by PROC GPLOT procedure [32] in SAS software.

For the final step, the Cochran–Mantel–Haenszel (CMH) analysis controlling for year was conducted in the combined sample of six cohorts [33]. The CMH method is usually used for combining information in a set of multiple 2 by 2 contingency tables. Therefore in this analysis perceived peer risk-involvement was categorized into two levels (“yes” = most or some friends and “no” = none of friends). Using a similar procedure to that employed by DiClemente et al [18], the perceived parental monitoring score was dichotomized as “more” if the youth scored 5 on each of the six items, and “less” for the rest of the sample. The CMH analysis addresses the same question as the analyses for the individual cohorts: “Is there an association between youth risk behavior and perceived parental monitoring or perceived peer risk-involvement?” In these analyses the overall association based on the odds ratios derived from each of the six 2 by 2 tables was being assessed. The CMH analysis procedure in SAS software included the following four steps: (a) computation of odds ratios for each of the 2 by 2 tables, (b) calculation of a pooled summary odds ratio estimated from the six 2 by 2 tables and a summary Cochran–Mantel–Haenszel statistic to test the significance of the overall association, (c) computation of the confidence interval for the common odds ratio, (d) performance of the Breslow-Day test to evaluate whether the six tables are homogenous. The Breslow-Day statistic tests the hypothesis that the odds ratios from the six tables are all equal [1]. Thus in this study, the Breslow-Day test examines the variability of the relationships between risk behavior and perceived peer involvement, and between risk behavior and perceived parental monitoring across the six cohorts.

Results

Sample Characteristics

Age and gender distributions for the participants from the six cohorts who were included in our study are shown in Table 1. The total sample size of adolescents aged 13 through 16 years was 1478, 48% of whom were boys. About 40% of the population were aged 13 years, 25% were aged 14 years, 22% were aged 15 years, and 13% were aged 16 years.

Age and Gender Differences in Adolescent Risk Behaviors

The distribution of each risk behavior by age and gender for the total population is shown in Table 2.
There is a significant increase in adolescent sexual activity \( (p < 0.0001) \), smoking \( (p < 0.001) \), alcohol use \( (p < 0.0001) \), marijuana use \( (p < 0.0001) \) and drug-selling \( (p < 0.0001) \) with age. The largest increase with age was seen in the category of sexual activity, 36% of 13-year-olds were sexually active compared to 75% of 16-year-olds. Marijuana use increased from 8% among children aged 13 years to 33% among those aged 16 years.

Gender also correlated with risk behavior involvement; the significant relationships were noted in sexual activity \( (p < 0.0001) \), violence \( (p < 0.05) \), drug-selling \( (p < 0.0001) \) and drug-delivering \( (p < 0.01) \). All the noted behaviors were more frequent among male adolescents.

### Age and Gender Differences in Perceived Parental Monitoring

The mean perceived parental monitoring scores for boys and girls, and for each individual age group are shown in Table 3. Girls had significantly higher mean perceived parental monitoring scores \( (p < 0.0001) \). Thirteen-year-olds had significantly higher mean monitoring scores \( (p < 0.05) \).

### Age and Gender Differences in Perceived Peer Involvement

Table 3 shows the mean perceived peer involvement prevalence for each risk behavior assessed for the total sample, and then separated by gender and then by age.

The significant gender differences were with the perceived peer involvement in sexual activity, alcohol use and drug-selling. Girls were less likely to perceive their peers to be sexually active than boys, \( (p < 0.01) \), and were also less likely to perceive their peers to be involved in drug-selling \( (p < 0.05) \). Girls were more likely to perceive their peers to be involved in alcohol use \( (p < 0.05) \).

Age had several significant associations. Increasing age was associated with an increase in the number of peer’s perceived to be sexually active \( (p < 0.0001) \), alcohol users \( (p < 0.0001) \), marijuana users \( (p < 0.0001) \) and drug sellers \( (p < 0.0001) \).

### Table 1. Sample Characteristics of the Subjects in the Surveys Conducted From 1992 to 1999

<table>
<thead>
<tr>
<th>Project</th>
<th>Year</th>
<th>Size</th>
<th>Age (yrs)</th>
<th>Number</th>
<th>Overall Information Gender</th>
<th>13</th>
<th>14</th>
<th>15</th>
<th>16</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cross-section 92</td>
<td>1992</td>
<td>455</td>
<td>9–15</td>
<td>152</td>
<td>Boy n (%)</td>
<td>77 (51)</td>
<td>75 (49)</td>
<td>67 (44)</td>
<td>43 (28)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Girl n (%)</td>
<td>75 (49)</td>
<td>77 (51)</td>
<td>67 (44)</td>
<td>43 (28)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>13 n (%)</td>
<td>67 (44)</td>
<td>43 (28)</td>
<td>38 (23)</td>
<td>28 (17)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>14 n (%)</td>
<td>43 (28)</td>
<td>38 (23)</td>
<td>28 (17)</td>
<td>18 (11)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>15 n (%)</td>
<td>38 (23)</td>
<td>28 (17)</td>
<td>18 (11)</td>
<td>12 (7)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>16 n (%)</td>
<td>28 (17)</td>
<td>18 (11)</td>
<td>12 (7)</td>
<td>7 (4)</td>
</tr>
</tbody>
</table>

### Table 2. Frequencies of Adolescent Risk Involvement Among the Subjects in the Surveys Conducted From 1992 to 1999

<table>
<thead>
<tr>
<th></th>
<th>Overall</th>
<th>Gender</th>
<th>Age (yrs)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n (%)</td>
<td>Boy n (%)</td>
<td>13 n (%)</td>
</tr>
<tr>
<td>Had sex ever</td>
<td>1383</td>
<td>726 (49)</td>
<td>408 (62)</td>
</tr>
<tr>
<td>Had unprotected sex</td>
<td>626</td>
<td>175 (28)</td>
<td>92 (27)</td>
</tr>
<tr>
<td>Violence</td>
<td>1294</td>
<td>304 (23)</td>
<td>162 (26)</td>
</tr>
<tr>
<td>Drug-selling</td>
<td>1475</td>
<td>258 (15)</td>
<td>131 (18)</td>
</tr>
<tr>
<td>Drug-delivering</td>
<td>1227</td>
<td>102 (8)</td>
<td>80 (14)</td>
</tr>
</tbody>
</table>

* p < 0.05; ** p < 0.01; *** p < 0.001; **** p < 0.0001.

Gender differences were determined by Chi-square test. Significant linear trend of age were determined by MH Chi-square test.

Unprotected sex is measured by “did not use condom during the last time having sex.”

N = number of subject answering the question.
Associations of Perceived Parental Monitoring With Risk Behaviors in Each of the Six Cohorts

There was an overall negative association between perceived parental monitoring and youth risk behavior. The odds ratios and associated p-values from the first set of multiple logistic regressions for each risk behavior are presented in Table 4.

With few exceptions (2 out of 39 categories), perceived parental monitoring had a protective association with risk behavior (odds ratios < 1). About half of the relationships were statistically significant. In the last four data sets there was a strong correlation between perceived parental monitoring and decreased levels of substance use behaviors (cigarette smoking, alcohol use and marijuana use). In three out of the four relevant data sets, increased levels of perceived parental monitoring were correlated with increased condom use as suggested by an odds ratio >1; however, none of these associations reached statistical significance. In two of the four data sets with the necessary information, there was a significant correlation between perceived parental monitoring and drug-selling. A behavior that was consistently not related to monitoring in the four data sets containing information about it, was drug-delivering (significant association in the 1999 data, but not in the other three data sets). In three of the four data sets with information about violence related behaviors, monitoring was protectively related; and in two of the five data sets with information about sexual initiation, monitoring was protectively related. These relationships were both significant.

Associations of Perceived Peer Involvement With Risk Behaviors in Each of the Six Cohorts

There was an overall positive association between perceived peer risk–involvement and youth risk behavior. The odds ratios and associated p-values from the first set of multiple logistic regressions for each risk behavior are presented in Table 4.

Regarding perceived peer risk–involvement, the odds ratios for youth risk behavior and protective behavior (i.e. condom use) ranged from 1.17 to 2.5 (indicating a positive association). The associations were significant in 23 of the 27 categories assessed. The youth who perceived high levels of peer involvement in a behavior (whether high risk or protective), were more likely to report that behavior. For example, the association between perceived peer condom use and increased adolescent condom use was significant in all four cohorts where data regarding this perception were collected.

Relative Influences of Perceived Parental Monitoring and Perceived Peer Risk–Involvement on Risk Behaviors

The relationships among youth risk behavior, perceived parental monitoring and perceived peer involvement are graphically represented in Figure 1. The graphs illustrate the multiple logistic regression equations (risk = perceived peer risk + perceived monitoring) shown in the last column of Table 4. The odds ratios and significance information for these regressions are shown in the specified column. The figures demonstrate the relative influences of perceived peer involvement and perceived parental

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Table 3. Mean Score and STD of Perceptions of Parental Monitoring and Peer Risk Involvements Among the Subjects in the Surveys Conducted From 1992 to 1999

<table>
<thead>
<tr>
<th></th>
<th>N^b</th>
<th>Overall</th>
<th>Boy</th>
<th>Girl</th>
<th>Age (ys)</th>
<th>13</th>
<th>14</th>
<th>15</th>
<th>16</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parental monitoring</td>
<td>1394</td>
<td>4.03 (0.89)</td>
<td>3.85 (0.91)</td>
<td>4.18 (0.85)***</td>
<td>4.09 (0.90)</td>
<td>4.05 (0.86)</td>
<td>3.95 (0.92)</td>
<td>3.91 (0.87)*</td>
<td></td>
</tr>
<tr>
<td>Peer risk prevalence</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Had sex</td>
<td>1253</td>
<td>3.49 (1.49)</td>
<td>3.64 (1.48)</td>
<td>3.36 (1.48)**</td>
<td>3.05 (1.58)</td>
<td>3.55 (1.38)</td>
<td>3.86 (1.31)</td>
<td>4.18 (1.18)****</td>
<td></td>
</tr>
<tr>
<td>Had unprotected sex</td>
<td>990</td>
<td>3.87 (1.26)</td>
<td>3.87 (1.28)</td>
<td>3.87 (1.25)</td>
<td>3.83 (1.34)</td>
<td>3.85 (1.24)</td>
<td>3.91 (1.24)</td>
<td>3.91 (1.18)</td>
<td></td>
</tr>
<tr>
<td>Cigarette</td>
<td>391</td>
<td>2.45 (1.55)</td>
<td>2.44 (1.54)</td>
<td>2.46 (1.56)</td>
<td>2.25 (1.55)</td>
<td>2.64 (1.52)</td>
<td>2.47 (1.48)</td>
<td>2.85 (1.68)</td>
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<tr>
<td>Alcohol</td>
<td>1268</td>
<td>2.64 (1.50)</td>
<td>2.54 (1.47)</td>
<td>2.73 (1.52)*</td>
<td>2.21 (1.45)</td>
<td>2.70 (1.48)</td>
<td>2.93 (1.44)</td>
<td>3.37 (1.35)****</td>
<td></td>
</tr>
<tr>
<td>Marijuana</td>
<td>1271</td>
<td>2.46 (1.57)</td>
<td>2.40 (1.57)</td>
<td>2.52 (1.57)</td>
<td>2.05 (1.48)</td>
<td>2.39 (1.56)</td>
<td>2.80 (1.56)</td>
<td>3.35 (1.42)****</td>
<td></td>
</tr>
<tr>
<td>Drug-selling</td>
<td>1185</td>
<td>2.11 (1.40)</td>
<td>2.20 (1.46)</td>
<td>2.03 (1.35)*</td>
<td>1.81 (1.27)</td>
<td>2.10 (1.36)</td>
<td>2.34 (1.47)</td>
<td>2.55 (1.33)****</td>
<td></td>
</tr>
<tr>
<td>Drug-delivering</td>
<td>309</td>
<td>1.68 (1.20)</td>
<td>1.74 (1.24)</td>
<td>1.61 (1.16)</td>
<td>1.57 (1.19)</td>
<td>1.66 (1.09)</td>
<td>1.82 (1.27)</td>
<td>1.77 (1.35)</td>
<td></td>
</tr>
</tbody>
</table>

* p < 0.05; ** p < 0.01; *** p < 0.001; **** p < 0.0001.

Significance tests regarding age and gender difference was obtained by one-way ANOVA.

b N = number of subject answering the question.
monitoring on youth risk behaviors. The probability scale enables us to understand the predicted values from the regressions more readily. Points on the graphs represent the probability of adolescent risk involvement given a specified parental monitoring score and a peer perception score. The three lines on each graph represent three different populations (the three levels of perceived peer involvement).

The first graph in Figure 1 depicts the associations between perceived peer involvement and youth risk behavior. The CMH information was not collected. There was a wide difference in the probability of sexual activity at each monitoring level given different peer perceptions. For instance, one can see that a highly monitored adolescent (mean monitoring level 5), given none of their peers were perceived to be sexually active, had a predicted probability of sexual activity around 0.1. The probability was as high as 0.7 if most of their peers were perceived to be sexually active. Perceived peer sexual involvement was significantly related to increased adolescent sexual involvement ($p < 0.0001$) as was increased perceived parental monitoring significantly associated with decreased adolescent sexual involvement ($p < 0.0001$).

The next graph illustrates the significant association between perceived peer condom usage and adolescent condom use ($p < 0.0001$), and the lack of a significant association between perceived parental monitoring and the same variable.

As seen in the next two graphs, perceived peer involvement was significantly associated with increased adolescent cigarette smoking ($p < 0.0001$) and marijuana use ($p < 0.0001$). The two graphs also show that perceived parental monitoring was associated with both decreased cigarette smoking ($p < 0.001$) and marijuana use ($p < 0.0001$). [Not shown in the figures, perceived peer involvement was significantly related to adolescent alcohol use ($p < 0.0001$) overall; and perceived parental monitoring was significantly associated with decreased alcohol use overall ($p < 0.0001$) even though there was a reverse but not significant effect seen in the 1993 data set (Table 4)].

As suggested by the final two graphs in Figure 1, perceived parent monitoring is significantly correlated with decreased drug-selling ($p < 0.0001$). Perceived peer involvement is significantly related to both adolescent drug-selling and drug-delivering ($p < 0.0001$ in both cases). There is no significant protective association between perceived parental monitoring and adolescent drug-delivering. Violence data are not displayed because peer violence information was not collected.

### Overall Significance of the Associations and the Homogeneity of the Odds Ratios Across the Six Cohorts

Of the total 1478 adolescents, 82% perceived their peers were sexually active, 52% perceived that their peers smoked cigarettes, 61% perceived that their peers drank alcohol, 52% perceived that their peers used marijuana, 43% perceived that their peers sold drugs and 27% perceived that their peers delivered drugs. Of the 581 adolescents who reported sexual experience, 92% perceived their sexually active peers to be condom users.

Table 5 depicts the results of the CMH analysis and the Breslow-Day test for perceived peer risk-involvement and youth risk behavior. The CMH analysis shows a strong peer association with all seven risk behaviors (most $p$-values $< 0.0001$), reinforcing the results of our analysis of individual data.

### Table 4. Multivariate Association Odds Ratios for Risk Behaviors Against Peer Perception, Perceived Parental Monitoring Across the Subjects in the Six Cohorts. The Results of Multiple Logistic Regressions

<table>
<thead>
<tr>
<th></th>
<th>Cross-section</th>
<th>FOK Baseline</th>
<th>Cross-section</th>
<th>NIA 96</th>
<th>ImPact</th>
<th>FOT Baseline</th>
<th>Overall</th>
</tr>
</thead>
<tbody>
<tr>
<td>Had sex ever</td>
<td>2.00***</td>
<td>1.18</td>
<td>1.42</td>
<td>0.64</td>
<td>1.49**</td>
<td>0.27***</td>
<td>0.91</td>
</tr>
<tr>
<td>Condom use</td>
<td>1.69***</td>
<td>1.16</td>
<td>1.95**</td>
<td>1.7</td>
<td>1.17*</td>
<td>0.96</td>
<td>0.91</td>
</tr>
<tr>
<td>Violence</td>
<td></td>
<td>0.84</td>
<td>0.84</td>
<td>0.51**</td>
<td>0.63**</td>
<td>0.73*</td>
<td>0.70</td>
</tr>
<tr>
<td>Cigarette</td>
<td>1.45**</td>
<td>0.72</td>
<td>0.93</td>
<td>1.58***</td>
<td>0.54**</td>
<td>2.44***</td>
<td>0.43*</td>
</tr>
<tr>
<td>Marijuana</td>
<td>1.3</td>
<td>0.62</td>
<td>2.17*</td>
<td>0.75</td>
<td>1.91***</td>
<td>0.42***</td>
<td>2.48***</td>
</tr>
<tr>
<td>Drug-selling</td>
<td>1.49*</td>
<td>0.87</td>
<td>1.56</td>
<td>0.76</td>
<td>2.50***</td>
<td>0.53*</td>
<td></td>
</tr>
<tr>
<td>Drug-delivering</td>
<td>1.84**</td>
<td>0.75</td>
<td></td>
<td>0.98</td>
<td>1.89***</td>
<td>0.88</td>
<td></td>
</tr>
</tbody>
</table>

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$; **** $p < 0.0001$.

*a* No data were collected for the cell with “-”.

*b* The odds ratios and the statistical significance were obtained from multiple logistic regressions. Perceived peer risks for the 1997 survey were not collected. Therefore only monitoring variable was used in the regressions for year 1997.
Figure 1. Predicted Probabilities of Youth Risk Behaviors by Multiple Logistic Regressions
sets. Heterogeneity in the odds ratios was not detected for any of the risk behaviors (the Breslow-Day test \( p \) values are all insignificant); therefore, in our population the direction and strength of peer influence did not appear to change significantly over the years.

Of the total population of 1478 adolescents, 84 were missing monitoring scores and 1129 (81%) were categorized as being "less" monitored. 88% of the adolescents, who reported being sexually active in the last 6 months, were "less" monitored compared to 74% of those who did not report sexual activity.

Table 5 also presents the results of the CMH analysis and the Breslow-Day test for perceived parental monitoring and youth risk behavior. The CMH analysis shows that the protective association between parental monitoring and risk behavior is significant for sexual risk, violence-related and substance use. Consistent with our findings from the individual cohorts, parental monitoring did not increase condom use, or protect against drug-selling and drug-delivering in this combined sample. The Breslow-Day test reveals that there was no heterogeneity in any of the relationships, with the exception of alcohol use (\( p = 0.04 \)). This finding indicates that the strength and direction of parental influence (whether protective or not) did not differ significantly over the years.

**Discussion**

The data in the current study support prior studies, demonstrating the strong influences that both perceived parental monitoring and perceived peer involvement have on a spectrum of adolescent risk behaviors even during an age span in which risk initiation is steep. The strengths of the current study include the data from six different cohorts of ethnically similar adolescents from socio-economically similar backgrounds living in the same city across the span of nearly a decade. For this reason the findings of this study cannot be applied to adolescents in general or of other ethnicities; but there are published data that support similar trends in other ethnic groups. Steinberg et al show that in a multi-ethnic adolescent population perceived parental monitoring deters adolescent substance use [24]. They also demonstrate that the more heavily involved peers are in substance use, the more likely the adolescent is to transition to heavier use [24]. In their large study population of mixed ethnicity, Resnick et al noted that family context variables explained 14% to 15% of the variability in adolescent emotional distress, 6 to 8% of the variability in cigarette use, 6% to 9% of the variability in alcohol use and 6% to 9% of the variability in marijuana use (the key aspect of family context was parent–family connectedness) [5]. High levels of parent–family connectedness and parental disapproval of sexual activity and contraception all significantly delayed onset of sexual intercourse [5].

Our data reflected an increase in sexual activity with increasing age, and there were also consistent increases in marijuana, tobacco, alcohol use and drug-selling with increasing age. There was consistently higher male involvement in violence, drug-selling, drug-delivering and in sexual activity. Prior studies have noted increases in most risk behaviors with age both cross-sectionally and longitudinally [1,4–6,8,21,25]. Increased male involvement in sexual activity, drug-trafficking, substance use and violence have all been previously reported [1,4,5,8,21,25,27,34,35]. Our data also demonstrated that female adolescents were less likely to perceive their peers to be sexually active. Older adolescents

|**Table 5. Cochran–Mantel–Haenszel (CMH) Analysis****  

<table>
<thead>
<tr>
<th>Perceived Parental Monitoring (More, Less)</th>
<th>Perceived Peer Risk (Yes, No)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CMH Summary Analysis</td>
<td>Breslow-Day Test</td>
</tr>
<tr>
<td>Common Odds (CI)</td>
<td>( p )-Value</td>
</tr>
<tr>
<td>Had sex ever</td>
<td>0.39 (0.3–0.6)</td>
</tr>
<tr>
<td>Condom use</td>
<td>1.44 (0.8–2.7)</td>
</tr>
<tr>
<td>Violence</td>
<td>0.42 (0.3–0.6)</td>
</tr>
<tr>
<td>Cigarette</td>
<td>0.42 (0.3–0.7)</td>
</tr>
<tr>
<td>Alcohol</td>
<td>0.48 (0.3–0.7)</td>
</tr>
<tr>
<td>Marijuana</td>
<td>0.29 (0.2–0.5)</td>
</tr>
<tr>
<td>Drug-selling</td>
<td>0.74 (0.4–1.4)</td>
</tr>
<tr>
<td>Drug-delivering</td>
<td>0.52 (0.2–1.4)</td>
</tr>
</tbody>
</table>

Dichotomized monitoring and peer risk variables were used in this analysis. Odds ratio indicates prevalence ratio.
were more likely to perceive their peers to be involved in sexual activity, substance use and drug-selling behaviors, which supports the concept of a rapid acquisition of risk behaviors during mid-adolescence. Our data did support a significant increase in perceived parental monitoring in girls, and a significant decrease in perceived parental monitoring with increasing age as has been described previously [4,9,25]. These changes occurred despite the narrower age span employed in this study.

The significant protective association of parental monitoring with substance use behaviors, sexual activity, violence and drug-selling (in half of the cohorts assessed) is consistent with previously reported data [4,13,18,22,23,25,36]. These data did not support a consistent protective association of perceived parental monitoring with drug-delivering, which we have previously reported [8,9], perhaps because in this instance, only information from the older teens (aged 13–15 years) were examined. One study that reported a protective effect of parental monitoring on drug-trafficking behaviors (selling and delivering) had a study population with a mean age of 11.39 years with a standard deviation of 1.67 years [8]. One could hypothesize that drug-trafficking behaviors can be successfully addressed by parental monitoring. The results from the 1992, 1993, 1994, and 1999 cohorts, are consistent with, and expand upon, findings that have been published for some of the individual cohorts regarding the lack of influence of parental monitoring on condom use [4,25]. The literature is inconclusive in this regard, as there have also been some reports to the contrary [18,36].

The reiteration of the positive associations of perceived parental monitoring is reassuring when one considers prior findings, which suggest that the effects of parental monitoring are sustained over time [8]. Also, even if transition in risk initiation is steep in these mid-adolescent years, monitoring is still effective. These findings are especially encouraging given the evidence that parenting skills can be taught with significant results [16,37,38]. Although, as we have noted earlier, parental monitoring is not related to condom use, parental communication was related [4]. Some researchers suggest that monitoring is knowledge parents’ have of their children’s whereabouts and activities [39]. This knowledge comes from both parents’ efforts (through solicitation and control) and the child’s willingness to divulge information [39]. They go on to question whether it is the “monitoring” or the presence of a parent–child relationship that fosters communication, that is protective [39]. Children who report problematic relationships with their parents have increased prevalence of risk behavior [40]. Resnick et al have reported the positive effects of “parent–family connectedness” [5].

The strong peer associations with a wide spectrum of risk behaviors are consistent with previous reports from other investigators [13,19,21–23], and from our own research [25,26]. The data also confirmed the association between perceived peer condom use and adolescent condom use reported by us [25] and others [41].

The overall associations of perceived peer involvement are both strong and consistent. There is evidence to suggest that parents can combat some of the harmful influence. For example Vitaro et al [42] found that best friend’s deviancy was not related to subsequent delinquent behavior among adolescents who had high levels of attachment to their parents, even if they had low levels of parental monitoring. It is also important to note that peer “prosocial” behavior or disapproval of deviancy is protective against some risk behaviors [20,21,23].

**Limitations**

These are cross-sectional data and therefore causality cannot be inferred. The subjects were recruited through convenience samples rather than a random sample, although this methodology should not affect analyses of peer and parental associations. Our population is completely African-American; hence the findings cannot be applied to other ethnic groups. Our analyses was confined to a narrow age range, therefore, the findings cannot be applied to the whole range of adolescents. We are only reporting perceived monitoring, but previous work has supported the high concordance between youth and parents’ perception of degree of monitoring [8].

Some portions of these data have been previously published [4,8,9,16]. However, the data from the 1999 data sets have never been published, the data sets have not previously been compared and the data have not been combined in any previous reports.

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**References**


