

## Sex differences in overt aggression and delinquency among urban minority middle school students

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### **Abstract:**

Given the recent debate over whether differential pathways to overt aggression and delinquency exist between boys and girls, this study examined sex differences in overt aggressive and delinquent acts along with potential differences in precursors (anger, self-control, family disruption) to antisocial behaviors among a sample of urban minority adolescents ( $N = 1559$ ). Using a longitudinal design with data from 6th to 7th grade, results showed that girls had greater increases in rates of aggression relative to boys. Delinquency increased over time for both boys and girls, with boys consistently engaging in more delinquency. Girls and boys did not differ on the level of risk factors experienced except for a greater increase in anger over time for girls relative to boys. Across sex, anger and self-control predicted increases in both overt aggression and delinquency; family disruption also predicted increases in delinquency. Implications for subsequent studies on developmental process and preventive interventions are discussed.

**Keyword:** Sex differences | Aggression | Delinquency | Minority students | Middle school

### **Article:**

#### **1. Introduction**

Research on the development of antisocial behavior, particularly overt aggression (physical and verbal aggression that is both direct and open) and delinquency, has been conducted primarily among boys. This is in part due to lower prevalence rates among girls. Recently however, studies have begun to address sex and gender differences in the etiology of antisocial behaviors and it has been proposed that the study of such differences can lead to a better understanding of the root causes of aggression and delinquency (Moffitt, Caspi, Rutter, & Silva, 2001). In light of recent research, debate has risen over the extent of sex differences in antisocial acts and whether there are differential pathways to both delinquency and overt aggression for boys and girls (Loeber and Stouthamer-Loeber, 1998, Moffitt et al., 2001, Zahn-Waxler, 1993 and Zoccolillo, 1993). The current study extends this line of research by examining potential sex differences in the predictive validity of anger, self-control, and family disruptions on increases in overt aggression and delinquency among young urban adolescents.

### *1.1. Sex differences in aggression and delinquency*

That males demonstrate greater overt aggression and delinquency has been well established in the literature (e.g., Coie and Dodge, 1998, Eagly and Steffen, 1986 and Hyde, 1984) with aggressive/delinquent behaviors observed to peak during adolescence (Coie & Dodge, 1998). National data (Centers for Disease Control & Prevention, 2004) show over two-fifths (41%) of high school boys report being in a physical fight at least once in the past year as compared to 25% of girls. In addition, 27% of high school boys report carrying a weapon to school whereas this behavior is reported by only 7% of high school girls. Rates of assault and gang membership among 12 to 16 year olds show similar differences, with 23% of boys and 12% of girls reporting assault and 6% of boys versus 3% of girls reporting gang membership (Snyder & Sickmund, 1999). However there is a growing sense that female delinquency and overt aggression is on the rise or, at least, that the difference between boys and girls is narrowing (see Odgers & Moretti, 2002 for a review).

Rates of delinquent behaviors and violence for females have shown an increase in recent years and are approaching the rates for males. From 1980 to 2001 juvenile arrests increased proportionately more for females than males. This is particularly true for violent crimes, with aggravated assault having increased by 24% for females, yet decreased by 21% for males. In addition, simple assault increased by 66% for females but only by 18% for males. Sex differences were also found in trends for less serious forms of delinquency, with vandalism having increased by 7% for females and decreased by 32% for males. Weapons possession decreased but with differential rates by sex: Only 8% for females and 37% for males (Snyder, 2003). Similar trends have also been found among Canadian adolescents (Leschied et al., 2001 and Odgers and Moretti, 2002).

While interest has recently turned to the development of aggression among adolescent girls, much of this work has been on indirect, relational or social aggression (Crick and Grotpeter, 1995 and Galen and Underwood, 1997) and not on overt or physical aggression or delinquency.

Further, the majority of studies that have examined physical aggression and delinquency among girls have used either cross-sectional data (DiNapoli, 2003 and Salmivalli and Kaukiainen, 2004) and/or have included only high-risk girls (Brennan et al., 2003 and Herrera and McCloskey, 2001). The current study examined change in overt aggression and delinquency as boys and girls transition through their first year of middle school.

While both overt aggression and delinquency fall under the general rubric of antisocial acts and, according to Problem Behavior Theory (Jessor & Jessor, 1977), share a similar etiology, recent studies have found that some problem behaviors vary with sex of the child whereas others do not. Cheong and Raudenbusch (2000) found delinquency to vary with both age and sex, with older adolescents and boys exhibiting greater delinquency, whereas aggression was similar across age and sex categories. On the other hand, Broidy et al. (2003) found etiologic differences by sex for delinquency but not aggression. Therefore, despite their similarities, it is important to distinguish between aggressive and delinquent behaviors when examining potential differences between male and female children and adolescents.

## *1.2. Sex differences in risk factors*

In their seminal study of antisocial disorder among a cohort of New Zealanders from birth to adulthood, Moffitt et al. (2001) found few sex or gender specific risk factors in the etiology of aggression or delinquency. Risk factors assessed in the study included maternal characteristics (such as mother's age at first birth, IQ, and mental health problems), family adversity, neurocognitive deficits, behavioral factors (e.g., temperament, hyperactivity, internalizing), and peer relationships. Overall, these risk factors predicted antisocial behavior in both girls and boys. However, boys experienced more cumulative risk factors than girls, thereby accounting, in large part, for their greater engagement in antisocial acts.

### *1.2.1. Family disruption*

Moffitt et al. (2001) did find that family adversity was a slightly stronger risk factor for boys than girls. However, other studies have found that antisocial girls frequently come from homes without two residential parents and from homes with numerous parental changes (see Silverthorn & Frick, 1999 for a review). Claims have been made that home environment, including frequent disruptions in household structure, is a more important predictor of aggression for girls than boys, but these claims have not been well-tested (Kruttschnitt, Gartner, & Ferraro, 2002). The current study examines whether associations between a recent family disruption and overt aggression or delinquency are moderated by sex of the child.

### *1.2.2. Self-control*

Associations have also been found between low self-control and a number of deviant behaviors among adolescents, including drunken driving, binge drinking, aggression, and juvenile delinquency (Coie and Dodge, 1998, Farrell and Sullivan, 2000, Griffin et al., 2000, LaGrange

and Silverman, 1999, Luengo et al., 1994 and White et al., 1994). The majority of this research has been conducted with males however, and little has been done to examine how adolescent sex moderates the association.

In their study of self-control, opportunities to engage in delinquency, and delinquency among Canadian secondary students, LaGrange and Silverman (1999) found measures of self-control, opportunity, and the interaction of self-control with opportunity to substantially reduce the effect of sex on delinquency but not to eliminate it completely. Another study tested the direct and indirect effects of self-control on both major and minor delinquency among high school students, considering male and female students separately (Mason & Windle, 2002). For boys, low self-control had a direct effect on both major delinquency (e.g., major theft, aggression, vandalism, and encounters with the law) and minor delinquency (e.g., oppositional behavior, school deviance, minor theft, and risky sexual behavior) as well as an indirect effect through an association with delinquent peers. For girls, however, low self-control had a direct effect on major delinquency, with no partial mediation through any other tested channels, and no direct effect on minor delinquency. Instead, girls' engagement in minor delinquency was fully mediated through their association with delinquent peers, their academic performance, and family support. These findings suggest that developmental pathways to problem behaviors may be dependent upon the *type* of delinquency for girls, but not for boys, with low self-control being particularly salient among girls engaged in more serious forms of aggression and delinquency.

Moffitt et al. (2001), using a similar construct, directly tested interaction effects of self-control and participant sex and found that constraint (comprised of self-control, harm avoidance and traditionalism) was predictive of antisocial acts for both males and females. But they found a small interaction of constraint by sex that suggested reduced constraint played a greater role for male antisocial behavior than female antisocial behavior. As they found with cumulative risk factors, boys were more likely to have low constraint and high negative affect; and these differences explained 96% of the effect of sex differences on antisocial behavior (Moffitt et al., 2001). The current study tested for sex differences in self-control over time as well as examined whether child/adolescent sex moderates associations between self-control and both aggressive and delinquent behaviors.

### *1.2.3. Negative affect*

Anger, a component of negative affect, is often associated with aggression (Novaco, 1976 and Tangney et al., 1996). However, anger is neither a prerequisite for aggression nor does the experience of anger inevitably lead to aggression (Cornell, Peterson, & Richards, 1999). Theories on sex and gender differences in anger often claim women have more problems experiencing and expressing anger than men, whereas men have more difficulty controlling or managing anger than women (Tavris, 1989). Because men are assumed to be more comfortable with both the experience and expression of anger and to have less anger control, their increased levels of aggressive behaviors are seen as an extension of anger expression. However these

differences in anger have primarily come from therapeutic experiences and therefore have been assumed more than tested (Sharkin, 1993).

Most studies on sex differences in anger have been conducted with adults and primarily with college students. The few studies that have tested participant sex effects in either the experience or expression of anger among adolescents have not shown significant differences (Armstead and Clark, 2002, Reyes et al., 2003 and Yarcheski et al., 2002). One study that focused on anger coping strategies among Caucasian and African American urban adolescents (13-20 years of age) found girls reported greater anger suppression than boys and Caucasians reported greater anger expression than African Americans (Musante & Treiber, 2000). Most of these studies, however, were cross-sectional in nature and did not examine increases in anger during adolescence, nor have they examined the differential effect of anger on antisocial behaviors by sex of participant. It has been suggested that one of the characteristics of the entry into adolescence is increase in moodiness and intensity of moods (Buchanan, 1991, Graber et al., 2005 and Larson et al., 1980) and some evidence suggests that moods may be more intense during the young adolescent period (Buchanan, 1991). Also, in recent work, it has been found that when girls experience rapid physiological changes at puberty they report greater intensity of anger (Graber et al., 2005). Examining potential sex differences in the association between anger and antisocial acts among young adolescents is an important next step for the field.

### *1.3. Study goals*

The current study had two primary aims. The first aim was to examine sex differences in aggression and delinquency among a sample of young urban minority adolescents over a one-year period. The second aim was to examine the predictive validity of anger, self-control and family disruption on aggressive and delinquent acts and to formally test for potential sex differences between 6th grade risk and protective factors and 7th grade aggression and delinquency.

This study examined these issues over a one-year period from 6th to 7th grades. Entry into middle school is a challenging time for adolescents. In addition to the pubertal changes of early adolescence, these students are exposed to more diverse and unique social situations that require generation of new, as yet untried, solutions. Rates of problem behaviors, such as delinquency and drug use, show the greatest increase after transitioning to a middle or junior high school environment, thereby making it a critical point for implementing preventive intervention (Botvin, 2000). A better understanding of sex differences in risk and protective factors during this period can contribute to the development of more effective prevention programs.

In addition, we specifically focused on aggression and delinquency among urban minority youth. Urban minority adolescents are disproportionately involved in aggressive and delinquent acts, particularly with regard to the juvenile justice system (Snyder, 2003). Several studies have examined sex differences in prevalence rates of urban minority youth (Clubb et al.,

2001 and Cotton et al., 1994) and have found high levels of aggression and delinquency among both boys and girls, although boys' rates were significantly higher. One study found smaller sex differences among urban as compared to rural adolescents (Farrell, Kung, White, & Valois, 2000). Few studies, however, have examined change over time or potential sex differences in predictors of aggression and delinquency among urban youth.

In the current study, sex differences in the risk and protective factors for aggression and delinquency were tested. We hypothesized that sex differences would be found in aggression and delinquency, but that rates among girls would still be high, as has been found in previous studies with urban minority youth (Clubb et al., 2001, Cotton et al., 1994 and Farrell et al., 2000). It was also hypothesized that boys would report greater risk and fewer protective factors than girls. In addition, although boys were expected to report greater risk and fewer protective factors overall, it was hypothesized that individual risk and protective factors would be equally predictive of increases in aggression and delinquency for both boys and girls, as was found by Moffitt et al. (2001).

## **2. Methods**

### *2.1. Research design*

The current study was part of a larger randomized clinical trial designed to expand and test the effectiveness of an already proven drug prevention strategy on violent and aggressive behavior. A total of 42 public and parochial middle schools in New York City participated in the intervention study. All schools participated in baseline data collection activities with their 6th grade classes, prior to the intervention, and annual surveys; half the schools received prevention programming for three years.

### *2.2. Participants*

The current study used data from the larger study collected at baseline (6th grade) and one-year follow-up (7th grade). Only participants assigned to the control condition at baseline ( $N = 2961$ ) were included in order to avoid contamination with potential intervention effects. An attrition rate of 26% (776 students) occurred from 6th to 7th grade, leaving a sample of 2185. Students were surveyed via two separate booklets across a two-day time period. Those students who were absent for either of the data collection days were only able to complete the first booklet. Therefore 26% ( $n = 564$ ) of students who did not complete the 2nd booklet at baseline were dropped from the current study. In addition, 62 (4%) students did not specify their sex and were dropped from the current study, leaving a final sample of  $N = 1559$ .

Demographic characteristics of the sample are shown in Table 1. The mean age for the sample included in the current analyses was 11.7 years in the 6th grade with a range of 9.9 to 14.0. The sample was approximately evenly distributed by sex and 54% of the students were girls. The majority of students were African American (47%) with other racial/ethnic groups including

Latino/Hispanic (27%), Asian American (5%), Caucasian (7%) and biracial or “Other” (13%). Almost all of the students (85%) attended public school. There was a confound between ethnicity and school type, such that Caucasian students were overrepresented in parochial schools. Although Caucasian students represented 7% of the sample overall, they represented 13% of the parochial school students. A measure of family SES was not available in this study, but given the characteristics of the schools and the communities from which students were drawn, the sample was predominately low income. Archival public school records show that the majority (88%) of schools had greater than 65% eligibility for free or reduced lunch. More than half (63%) of the students came from families with two residential parents, 14% of which lived in blended households (with stepparents or split time between mother and father's home). Approximately a third (31%) of the students lived with a single parent and the remainder (6%) lived in households without any parent present (with other relatives, or with foster parents or guardians).

**Table 1.** Descriptive characteristics of boys and girls in the sample

	Total		Girls		Boys	
	<i>N</i>	%	<i>N</i>	%	<i>N</i>	%
Ethnicity						
African American	730	47	415	50	315	44
Latino	425	27	216	26	209	29
Asian American	79	5	38	5	41	6
Caucasian	115	7	52	6	63	9
Other/Biracial	202	13	111	13	91	13
Household structure						
Two-parent, non-blended	768	50	411	50	357	50
Single	473	31	248	30	225	32
Blended	214	14	115	14	99	14
Other	86	6	53	6	33	5
Public school	1327	85	715	86	612	85

To test for differences between students in the current study and those who were in the full baseline sample, *t*-tests were conducted on all continuous variables and chi square analyses were run on all background variables from the 6th grade data. Students who were not included in the current study were more likely to be boys [ $\chi^2(1, N = 2833) = 15.32, p < .001$ ], with 49% of boys lost to the study as compared to 41% of girls. Latinos were more likely to remain in the study [ $\chi^2(1, N = 2927) = 9.24, p < .01$ ], with 45% of Latinos lost to the study as compared to 51% of non-Latinos. Parochial school students were also more likely to remain in the study [ $\chi^2(1, N = 2961) = 70.89, p < .001$ ], with 25% of parochial school students lost to the study as compared to 50% of public school students. A significant difference was also found for family structure [ $\chi^2(1, N = 2840) = 33.1, p < .001$ ], with 40% of students from two-parent, non-blended homes lost to the study as compared to 50% of students from any other family structure. In the 6th grade, students who were lost to the study had significantly higher self-reported delinquency than those who were retained in the study, *M* (and *SD*) = 1.41 (.60) and 1.36 (.50), respectively,  $t(2680) = 2.19, p < .05$ , but no significant differences were found for level of aggression ( $p = .29$ ).

### 2.3. Procedure

A passive consent procedure approved by the Weill Cornell Medical College IRB was used to inform parents about the nature of the study and to provide them with an opportunity to disallow their child's participation. A consent form describing the focus of the larger study and the self-report survey was distributed in the schools for students to take home to their parents, as well as mailed directly to students' homes. Students (5%) whose parents indicated they did not want them to participate in the self-report survey did not complete any of the data collection activities.

The survey was divided into two separate booklets and data collection was conducted on two separate days during regular 40-min class periods. A multi-ethnic team of three to five data collectors administered the questionnaire following a standardized protocol similar to those used in previous research (e.g., Botvin, Schinke, Epstein, & Diaz, 1994). Steps were taken to ensure the quality of self-report data. Identification codes rather than names were used to emphasize the confidential nature of the questionnaire and students were assured about the confidentiality of their responses. Carbon monoxide (CO) breath samples were also collected at both the pretest and posttest to enhance the validity of self-report data utilizing a variant of the bogus pipeline procedure developed by Evans, Hansen, and Mittlemark (1977). While this measure was used to increase the validity of questions pertaining to cigarette smoking, studies have shown bogus pipeline procedures can also increase the validity of other problem behaviors (Tourangeau, Smith, & Rasinski, 1997).

### 2.4. Measures

#### 2.4.1. Demographic data



Data concerning the characteristics of the participants were collected using standard survey items concerning sex (dichotomous variable), age (continuous variable), and ethnicity (5 group variable, African American, Latino, Caucasian, Asian American, and other).

#### *2.4.2. Overt aggression (past month)*

Ten items were used to assess general aggression. These items were drawn from the aggression scale of the Youth Self-Report (YSR, Achenbach & Edelbrock, 1986). Students were asked how many times in the past month they had engaged in ten types of incidents of overtly aggressive behavior ( $\alpha = .92$ ). Items included “Yelled at someone (you were mad at),” “Told someone off,” “Pushed or shoved someone on purpose,” and “Hit someone.” Response categories were on a 5-point scale. Response options included 1 (Never), 2 (Once), 3 (2-3 times), 4 (4-5 times), and 5 (More than 5 times). Items were averaged with higher scores indicating greater aggression. Dichotomous variables were also created to assess engagement in one or more aggressive acts (1 = any engagement in aggression; 0 = no engagement) and to assess more serious engagement as defined by multiple acts of aggression (1 = 5 or more acts of aggression; 0 = less than 5 acts of aggression).

#### *2.4.3. Delinquency (past year)<sup>1</sup>*

Students were asked how many times in the past year they had engaged in 10 types of incidents of delinquent behavior ( $\alpha = .84$ ). These items were adopted from a violence/delinquency scale developed by Elliot, Huizinga, and Menard (1989). Items included “Thrown objects such as rocks or bottles at cars or people,” “Hit someone with the intention of hurting them,” “Taken part in a fight where a group of your friends were against another group,” “Purposefully damaged or destroyed property or things that did not belong to you,” “Taken something from a store when the clerk wasn't looking,” and “Taken something worth less than \$50.” Response categories were on a 5-point scale. Response options included 1 (Never), 2 (Once), 3 (2-3 times), 4 (4-5 times), and 5 (More than 5 times). Items were averaged with higher scores indicating greater delinquency. Dichotomous variables were also created to assess engagement in one or more delinquent acts (1 = any engagement in delinquency; 0 = no engagement) and to assess more serious engagement as defined by multiple acts of delinquency (1 = 5 or more acts of aggression; 0 = less than 5 acts of delinquency).

#### *2.4.4. Anger*

Anger was assessed with the seven-item Anger subscale ( $\alpha = .74$ ) from the Buss and Perry (1992) Aggression Questionnaire. Students were asked to rate how well a series of statements fit them. Items included “I sometimes feel like a powder keg ready to explode,” “I have trouble controlling my temper,” and “When frustrated, I let my irritation show.” Response categories ranged from 1 (Really Not True for Me) to 5 (Really True for Me). Items were averaged such that higher scores indicate greater anger.

#### 2.4.5. *Self-control*

Thirteen items ( $\alpha = .76$ ) from the Kendall and Wilcox Self-Control Rating Scale (1979) were used to measure self-control skills. The Self-Control Rating Scale assesses the ability to manage impulsive or disruptive behavior, particularly in school settings (e.g., “When I have to wait on line, I do it patiently.”). Response categories ranged from 1 (Strongly Disagree) to 5 (Strongly Agree). Items were averaged with higher scores indicating high self-control.

#### 2.4.6. *Family disruption*

Household structure was self-reported in the survey at both 6th and 7th grades. To capture adolescent's exposure to a recent family disruption a new variable was created by first computing all of the possible differences in household structure between the 6th and 7th grade household structure variables. This new variable was used to create 4 groups: No change in family structure (80%); change from a single-parent, a blended, or other family structure to a two-parent, non-blended family structure (4%); change within single, blended, and other family structures (10%); and change from a two-parent, non-blended to single-parent, blended, or other family structure (6%).

### 3. Results

#### 3.1. *Descriptive statistics*

Overall, the prevalence of aggression was high, with few notable differences between male and female students in the prevalence of engagement in aggressive and delinquent acts. In the 6th grade, rates of reports of one or more aggressive acts were comparable for girls and boys (95% vs. 94%, respectively,  $\chi^2(1, N = 1484) = 1.44, ns$ ), and rates of multiple aggressive acts (5 or more incidents in the past month) were lower for girls than boys (64% vs. 69%, respectively,  $\chi^2(1, N = 1484) = 4.1, p < .05$ ). In the 7th grade, rates of one or more incidents of aggression were still comparable for male and female students (97% for girls and 95% for boys,  $\chi^2(1, N = 1486) = 3.24, ns$ , but so were rates of multiple incidents of aggression (81% vs. 78%, respectively,  $\chi^2(1, N = 1486) = 3.08, ns$ ).

Rates of one or more instances of delinquent behavior in the 6th grade differed by sex, with girls reporting fewer such acts of delinquency than boys, 66% vs. 76%, respectively,  $\chi^2(1, N = 1512) = 18.16, p < .001$ . For multiple acts of delinquency (5 or more incidents in the past year) in the 6th grade, the difference between female students and male students was pronounced, with 11% of girls vs. 21% of boys showing such levels of multiple delinquent acts,  $\chi^2(1, N = 1512) = 25.71, p < .001$ . By 7th grade, however, the rates for at least one act of delinquency were comparable for girls and boys, 78% vs. 80%, respectively ( $\chi^2[1, N = 1505] = .97, ns$ ), although the sex difference in the rates for multiple acts of delinquency was still significant, 27% for girls vs. 34% for boys ( $\chi^2[1, N = 1505] = 9.43, p < .01$ ).

Table 2 shows the bivariate associations between study variables. As expected, delinquency and aggression were highly correlated with one another. Correlations between predictor variables, however, were weak to moderate in strength (Cohen, 1988) and therefore indicated no potential problems with multicollinearity. As indicated previously, ethnicity was confounded with school type, which was demonstrated in the significant, but very small positive association between African American ethnicity and public school attendance and the negative association between Caucasian ethnicity and public school attendance. In addition, school type was positively associated with family disruption indices. Further analyses revealed students who attended parochial schools were more likely to reside in families with stable family structure than students who attended public school [ $\chi^2(3, N = 1507) = 10.52, p < .05$ ; 88% of parochial school students vs. 79% of public school students].

**Table 2.** Correlations among study variables

	1	2	3	4	5	6	7	8	9	10	11
1. Student sex	–										
2. Public school	– .01	–									
3. African American <sup>a</sup>	– .06*	.08**	–								
4. Latino <sup>a</sup>	.04	– .03	n/a	–							
5. Caucasian <sup>a</sup>	.05	– .10**	n/a	n/a	–						
6. Two-parent, non-blended family	– .00	.13**	.20**	– .04	– .11**	–					
7. Aggression	.08**	.01	.11**	.10**	.00	.10**	–				
8. Delinquency	.17**	.03	.09**	– .07**	– .02	.07	.71	–			
9. Self-control	– .00	– .05	.01	– .04	.01	– .02	– .33**	– .30**	–		
10. Anger	– .04	.06*	.01	– .02	.01	.05	.31**	.26**	– .24*	–	
11. Any family disruption <sup>b</sup>	.01	.08*	.02	.02	.06*	.19**	.07*	.08**	.06*	.04	–

*Note.* For public school, two-parent, non-blended family, and any family disruption 1 indicates presence; for sex 1 = boys. \*  $p < .05$ . \*\*  $p < .01$ . <sup>a</sup>Correlations were not applicable due to an artifact caused by variable coding. <sup>b</sup>Variable dichotomized as any family disruption versus no family disruption.



6th Grade	2.5 <sup>c</sup>	(.89)	2.56	(.85)	2.49	(.93)	2.54	(.92)	2.50	(.88)	2.57	(.81)	2.58	(.74)	2.53	(.90)
7th Grade	2.7 <sup>c</sup>	(.89)	2.8 <sup>h</sup>	(.88)	2.6 <sup>h</sup>	(.89)	2.50	(.88)	2.69	(.86)	2.72	(.81)	2.71	(.74)	2.72	(.93)
Self-control																
6th Grade	3.4 <sup>d</sup>	(.58)	3.46	(.57)	3.45	(.59)	3.46	(.57)	3.42	(.57)	3.47	(.59)	3.52	(.59)	3.47	(.63)
7th Grade	3.3 <sup>d</sup>	(.57)	3.33	(.58)	3.37	(.57)	3.36	(.57)	3.30	(.52)	3.31	(.64)	3.46	(.55)	3.37	(.64)

*Note.* Means that share a superscript differ at  $p < .05$ .

Aggression: Range = 1-5,  $n = 1557$  (6th grade),  $n = 1558$  (7th grade); delinquency: Range = 1-5,  $n = 1557$  (6th grade),  $n = 1558$  (7th grade); anger: Range = 1-5,  $n = 1557$  (6th grade),  $n = 1391$  (7th grade); self-control: Range = 1.3-5,  $n = 1559$  (6th grade),  $n = 1391$  (7th grade).

For delinquency, a significant main effect was found for time of measurement [Wilks  $\Lambda = .94$ ;  $F(1, 1542) = 91.33$ ,  $\eta^2 = .06$ ;  $p < .001$ ], with significant increases in level of delinquency from 6th to 7th grade. There were no significant interaction effects involving time by student sex or time by ethnicity. There was a significant main effect for student sex [ $F(1, 1542) = 44.74$ ,  $\eta^2 = .03$ ;  $p < .001$ ] with boys reporting greater delinquency than girls. A significant effect for ethnicity [ $F(1, 1542) = 7.02$ ,  $\eta^2 = .02$ ;  $p < .001$ ] was due to African American students' significantly higher reports of delinquency than Latino students and Asian American students ( $ps < .01$ ).

For anger, there was a significant main effect for time of measurement [Wilks  $\Lambda = .98$ ;  $F(1, 1376) = 3.54$ ,  $\eta^2 = .02$ ;  $p < .001$ ] as well as a time by student sex interaction [Wilks  $\Lambda = 1.0$ ;  $F(1, 1376) = 5.56$ ,  $\eta^2 = .01$ ;  $p < .05$ ]. Girls reported an increase in anger from 6th to 7th grade whereas boys anger levels remained the same (see Table 3). There were no significant effects for ethnicity.

For self-control, there was a significant main effect for time of measurement [ $\Lambda = .98$ ;  $F(1, 1339) = 23.30$ ,  $\eta^2 = .02$ ;  $p < .001$ ]. As evident by the means reported in Table 3, self-control decreased from 6th to 7th grade. There were no significant effects by ethnicity or by student sex.

### 3.3. Student sex by risk factor interactions on aggression and delinquency

To test for student sex by family disruption interactions, separate 2 (Student sex)  $\times$  4 (Family disruption)  $\times$  2 (School type) analyses of covariance (ANCOVAs) were computed for each of the four measures of student behavior, with the time 1 baseline measure of the behavior as a covariate. School type was included in the analyses due to the previously observed differences in family disruption by school type. Neither the family disruption by student sex interaction term, nor the family disruption by school type interaction term was significant in either analysis. However, a significant main effect for family disruption was found for both aggression,  $F(3, 1491) = 4.25, p < .01$ , and for delinquency,  $F(3, 1491) = 3.99, p = .01$ . Post hoc analyses conducted with Bonferroni adjustments showed that students who experienced a change in family structure from a two-parent, non-blended household to any other family structure demonstrated higher levels of delinquency in 6th grade level of delinquency, than students who did not experience a family disruption and from students who experienced a change from any other family structure to a two-parent, non-blended household. Students who experienced a change in family structure from any other family structure to a two-parent, non-blended household demonstrated lower levels of aggression in 7th grade, after controlling for 6th grade level of aggression, than students who experienced a change either within single-parent, blended, or other family structures, or from a two-parent, non-blended household to any other family structure (see Table 4).

**Table 4.** Mean level of 7th grade antisocial behaviors by family disruption, adjusted for baseline behaviors

	Aggression		Delinquency	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SE</i>
No change	2.83	.04	1.57 <sup>c</sup>	.03
Any other family structure to two-parent, non-blended	2.02 <sup>a,b</sup>	.31	1.31 <sup>d</sup>	.19
Change within single-parent, blended, or other family structure	3.11 <sup>b</sup>	.14	1.64	.08
Two-parent, non-blended to any other family structure	3.12 <sup>a</sup>	.20	1.94 <sup>c,d</sup>	.12

*Note.* Means that share superscript differ at  $p < .05$ .

A series of multiple regression analyses were conducted to examine anger and self-control, in interaction with student sex, in relation to both aggression and delinquency. Three hierarchical regression models were conducted using aggression as an outcome measure and using delinquency as an outcome measure. The first model regressed the outcome measure (aggression or delinquency) on student sex and the baseline measure of aggression or delinquency, as appropriate. The second model included variables from that first model as well as the risk factor (anger or self-control) being tested. The final model included all previous variables along with a

student sex by risk factor (anger or self-control, as appropriate) interaction term. Model 2, which included the risk factors of anger/self-control, was a significant improvement over Model 1 for each analysis. That is, reporting greater anger in 6th grade was associated with higher levels of aggression,  $F(3, 1550) = 170.84, p < .001; \beta = 5.62$ , and greater delinquency,  $F(3, 1550) = 161.05, p < .001; \beta = 4.02$ , in the 7th grade. Reporting greater self-control in the 6th grade was associated with less aggression,  $F(3, 1534) = 165.27, p < .001; \beta = 3.59$ , and less delinquency,  $F(3, 1534) = 161.88, p < .001; \beta = 4.46$ , in the 7th grade. Model 3, which included student sex, was not a significant improvement over Model 2 for any analysis, indicating sex did not moderate the association between either risk factor with either aggression or delinquency.

### 3.4. Relative associations among risk factors and aggression/delinquency

To examine the relative associations between anger, self-control, and family disruption on increases in aggressive and delinquent behaviors from 6th to 7th grades, hierarchical multiple regressions were conducted for each of the outcomes. In these models, ethnicity, student sex, school type, and the 6th grade measure of aggression or delinquency were entered on the first step and on the second step anger, self-control, and family disruption were entered. For these analyses, the family disruption was captured with three dummy-coded variables to indicate each type of family disruption (any other family structure to a two-parent, non-blended household; within single-parent, blended, or other family structures; two-parent, non-blended household to any other family structure), with no family disruption as the reference variable. Due to the previous findings that African Americans engaged in higher levels of aggression and delinquency, the ethnicity variable was dummy-coded to represent African Americans versus all other ethnic groups. Collinearity diagnostics were run for all models and the variance inflation factor (VIF) was found to be well within the acceptable range (between 1.02 and 1.20) for all variables across models, indicating multicollinearity was not a problem in any of the regression analyses (Stevens, 1996). Because none of the student sex by risk interaction terms were found to be significant in any of the previous analyses, they were not included in the current models.

Table 5 shows the standardized betas for the final multiple regression models for aggression and delinquency. The behavior (aggression or delinquency as appropriate) at 6th grade was a significant predictor of the same behavior in 7th grade for both outcomes, as was expected. Greater anger and less self-control predicted an increase in aggression over time after accounting for 6th grade aggression. Family disruption was not significantly associated with increases in aggression when anger and self-control were included as predictors in the model. However, greater anger, less self-control, and experiencing a family disruption were associated with greater delinquency over time.

**Table 5.** Final regression models for aggression and delinquency with all predictor variables

	Aggression	Delinquency

	Model 1	Model 2	Model 1	Model 2
	$\beta$	$\beta$	$\beta$	$\beta$
Baseline behavior	.47 <sup>***</sup>	.40 <sup>***</sup>	.46 <sup>***</sup>	.40 <sup>***</sup>
Sex	-.05 <sup>*</sup>	-.03	.04	.05 <sup>*</sup>
African American	-.06 <sup>**</sup>	-.07 <sup>**</sup>	-.06 <sup>*</sup>	-.06 <sup>**</sup>
Public school	.03	.02	.02	.01
Anger	-	.12 <sup>***</sup>	-	.09 <sup>***</sup>
Self-control	-	-.09 <sup>***</sup>	-	-.10 <sup>***</sup>
Any other family structure to two-parent, non-blended	-	-.04	-	-.03
Within single-parent, blended, or other family structure	-	.03	-	.02
Two-parent, non-blended to any other family structure	-	.04	-	.07 <sup>□□</sup>
$R^2$	.23	.25	.23	.25
Model statistic	$F(4, 1491) = 112.64$	$F(9, 1486) = 57.68$	$F(4, 1491) = 109.29$	$F(9, 1486) = 55.83$

\*  $p < .05$ . \*\*  $p < .01$ . \*\*\*  $p < .001$ .

#### 4. Discussion

The first aim of the study was to examine sex differences in the course of aggression and delinquency from 6th to 7th grades among an urban minority sample, as well as potential sex differences among risk and protective factors for antisocial behaviors. Engagement in delinquent and aggressive behaviors was fairly high in the sample, as has been found with other urban minority samples (Clubb et al., 2001, Cotton et al., 1994 and Farrell et al., 2000). As hypothesized, sex differences were found for delinquency, with boys reporting greater engagement in delinquent acts in both 6th and 7th grade. Also as hypothesized, these differences were small in magnitude and, although still significant, had decreased by 7th grade. Contrary to expectations, girls' rates of aggression increased significantly more than boys from 6th to 7th grade. Delinquency, although it may contain aggressive components, encompasses violating legal and social sanctions (e.g., stealing, vandalism), whereas the measure of overt aggression used in this study (i.e., pushing, shoving, hitting) represents a different type of social transgression. Social norms may make more allowances and possibly even expect a degree of



delinquent behavior from boys than from girls. While previously this might have been true for aggressive behavior as well, changing social norms may account for the increase in these forms of aggression among girls.

In the Dunedin study, Moffitt et al. (2001) found significant sex differences in almost all measures of aggressive and delinquent behaviors, with the gap between boys' and girls' behaviors being narrowest at age 15. In the current study, girls appear to be closing the gap a year or two earlier than boys. The contrary findings in the current study may be due to important differences in the two samples. For example, the current study takes place in a different country (United States vs. New Zealand) with a later birth cohort (1986 vs. 1973). In addition, the Dunedin study (Moffitt et al., 2001) represented a national sample, whereas the current study was a predominately inner-city minority sample. A comparison of developmental trajectories of aggression from six sites across three countries (Canada, New Zealand and the United States) found more similarity within than across countries (Broidy et al., 2003) indicating that antisocial behaviors are dependent upon social and cultural contexts. Within the U.S., Farrell et al. (2000) found prevalence rates of physical aggression to be more similar across males and females in an urban as opposed to a rural sample. Other studies conducted with urban middle school youth have found similarly high rates of aggression among adolescent girls (Blitsten et al., 2005 and Clubb et al., 2001). Likewise, several recent qualitative studies have demonstrated a greater propensity towards physical aggression among urban minority girls (Talbot et al., 2002 and Taylor et al., 1995) and rural, blue collar Caucasian girls (Brown, 1998) as opposed to middle-class Caucasian girls. Therefore it may be that urban minority girls are at greater risk than other girls for increased engagement in delinquency and aggression at earlier ages. Whether these behaviors continue to become more similar, or if as was seen in the Dunedin study (Moffitt et al., 2001), they begin to diverge again at a later age is an important question for future studies.

As indicated, the second aim of this investigation was to examine the predictive validity of anger, self-control and family disruption on aggressive and delinquent acts and to formally test for potential sex differences between 6th grade risk and protective factors and 7th grade aggression and delinquency. Contrary to expectations there were few sex differences in the levels of risk and protective factors for aggression and delinquency. No significant differences were found for self-control or family disruption for boys versus girls and, contrary to expectations, girls reported greater increases in anger from 6th to 7th grade than boys, although the size of the effect was small. At first glance these findings appear to conflict with those reported for the Dunedin study (Moffitt et al., 2001), in which boys' greater risk factors accounted for their increased aggression and delinquency. However, it may be that in the present study the greater similarity that was found in boys' and girls' aggressive behavior was due to their underlying similarities in levels of risk and protective factors. Student sex was also not a significant modifier of any risk factor for aggression or delinquency, demonstrating that there were more similarities in the predictors of aggression and delinquency for girls and boys than there are differences. This

is an important finding in itself given the lack of published studies that report similarities for males and females in the developmental processes of antisocial behavior (Moffitt et al., 2001).

While girls' anger increased from 6th to 7th grade in the current investigation, both girls and boys reported decreases in self-control over this same time period. Thus, girls were experiencing greater anger intensity over time, decreasing their regulation skills, and demonstrating increases in their aggressive and delinquent behaviors. Previous studies have also found girls' level of self-esteem and academic achievement decrease at a greater rate than boys in early adolescence (Brown and Gilligan, 1992 and Orenstein, 1994). Together, such findings and the limited studies on mood intensity (Buchanan, 1991, Graber et al., 2005 and Larson et al., 1980) suggest that the entry into adolescence might be a particularly vulnerable time for girls in terms of anger. Future studies need to replicate our findings that girls' anger increases during this time period, whereas boys' levels remain stable, as well as determine whether this difference is due to a developmental delay among boys and whether their levels of anger change at a later stage in development. Also studies are needed that examine the potential factors that may account for such sex differences in the transition to adolescence. For example, previously identified sex differences in the experiences of stressful life events (e.g., Brooks-Gunn, 1991 and Ge et al., 1994) or differences in the onset of puberty may account, in part, for different patterns of anger levels at this stage of development.

Previous studies that have examined sex differences in antisocial behaviors report conflicting results. Some studies have found remarkable similarities between males and females in the etiology and stability of antisocial behaviors (Connor et al., 2003, Herrera and McCloskey, 2001, Moffitt et al., 2001 and Williams et al., 2001) whereas others have found marked differences (Brennan et al., 2003, Broidy et al., 2003, LaGrange and Silverman, 1999 and Lewin et al., 1999). A recent criticism cites the lack of formal testing for sex differences in most studies (Moffitt et al., 2001); instead many studies run models separately for male and female participants and differences in significant *p*-values are reported and interpreted as evidence of sex-specific risk. Therefore many reported sex differences may not be robust. The current study highlights the importance of examining differences by sex in the developmental processes of antisocial behavior by formal tests of interaction effects rather than either analyzing the data separately or using sex as a control variable.

Although sex differences in the role of risk and protective factors in aggression and delinquency were not prevalent, these factors were important in the models tested, as expected. Engagement in baseline behaviors was the strongest predictor of all 7th grade behaviors, as would be expected. There were few differences by background characteristics, except for the consistent finding that being African American was associated with greater engagement in all aggressive and delinquent behaviors in the 7th grade. The second step in these models reflects the additional contribution of emotion (anger) and regulation (self-control), as well as a recent source of stress (family disruption) to aggression and delinquency after accounting for the expected, substantial continuity in these constructs. In the current study, anger and self-control were associated with

both delinquency and aggression for both boys and girls. These findings are consistent with previous studies on the predictors of antisocial behavior among youth (Coie and Dodge, 1998, Cooper et al., 2003 and Loeber and Hay, 1997). However, family disruption was only associated with delinquency once anger and self-control were included. Going from a two-parent, non-blended household to any other family structure (single-parent, blended family or living in a no parent household) was associated with a significant increase in delinquency as compared to students not experiencing any family disruption. However, given that family disruption was only measured from 6th to 7th grade and no measures were available on previous changes in household structure or on how the change was experienced by the family, these results should be interpreted with caution. Future studies should include a measure of cumulative family disruptions and instability as well as other potential stressors (i.e., number of moves and school changes) to more fully examine sex differences in the associations between life stressors and the development of antisocial behaviors.

There are several other limitations to the present investigation. As indicated, the focus in this study was on urban, minority youth. As such, findings cannot be generalized to youth in suburban or rural communities. In addition, the measures in this investigation are self-reported in a survey format. Protocols were utilized to generate valid reporting of deviant behaviors but the protocol was still limited to the adolescent's self-report. Given that fairly high rates of aggressive and delinquent behaviors were reported, it does not seem that substantial under-reporting of deviant behaviors occurred. Finally, several studies have reported sex differences in the use of indirect or relational aggression (Crick, 1996, Crick, 1997 and Crick and Grotpeter, 1995) and there is recent debate over whether relational aggression is the "female aggression" (Hadley, 2004 and Underwood et al., 2001). Unfortunately because the larger prevention study did not include a focus on relational aggression we were not able to examine sex differences in this type of aggression within the current study. However the current study does support the need for prevention programs to target broader definitions of aggression among females. Programs that address both overt and relational aggressive behaviors are more likely to be effective (Leff, Power, Manz, Costigan, & Nabors, 2001).

Additional research is needed to assess the differential impact prevention programs may have on both girls and boys. In particular, determining which mediational mechanisms facilitate behavior change for girls and for boys could help tailor and improve effective prevention programs. For example, increases in girls' antisocial behaviors may be related to increased experiences of anger. Because anger levels increased significantly for girls but self-control appears to decrease over time, intervention approaches for girls may need to focus on readjusting norms and dealing with the underlying causes of anger, in addition to skill development. As this study has shown, in the absence of an intervention program, self-control decreases for both boys and girls from 6th to 7th grades. Because social skills appear to be important predictors of delinquency and aggression, it is likely that increases in skill ability would be associated with decreases in more moderate levels

of aggression as well. Skill development, particularly self-regulation and anger management are critical components for future intervention efforts.

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