

**Understanding the Sources of Racial and Gender Disparities
in Early Childhood Aggression**

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Abstract

This investigation uses data from the Fragile Families and Child Wellbeing Study to identify the pattern of aggression by sex and race among young black and white children and uses hierarchical linear models to explore whether child gender moderates the influences of neighborhood characteristics, family structure or parenting practices on aggression. Two key findings emerge. First, at ages 3 and 5, black boys are more aggressive than their peers. Second, child gender moderates a number of influences on aggression. Among blacks, having a biological or social father move into the household by age 3 and mothers' victimization by violence associate with higher initial aggression in boys than girls. In the case of a partner moving in, the gender gap lessens with age. Among whites, having a partner move out and mothers' use of nonviolent discipline associate with higher initial aggression in boys than girls. Neither gap lessens with age.

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From childhood onward, non-Hispanic black and white males have worse outcomes across a variety of domains than their female counterparts, with black males having the worst outcomes overall. [In the remainder of this paper, non-Hispanic whites will be referred to as “whites” and non-Hispanic blacks as “blacks”]. Early on in school, rates of grade retention, suspension and expulsion are higher among boys than girls, with black boys having the highest rates (Skiba, Michael et al. 2002; Hauser, Pager et al. 2004). Black boys also have the highest rates of high school dropout at 13 percent as compared to 9 percent for black females, 7.9 percent for white males and 6.9 percent for white females (Freeman 2004). Of particular concern is the racial gap in crime and incarceration. Young, black males represent about 25 percent of homicide offenders and 15 percent of victims, while representing only 1 percent of the total population (Fox and Zawitz 2004).

Despite this evidence, research has yet to determine just how early in life these race-gender disparities begin or to fully understand what brings them about. A substantial body of research implicates social and economic factors as causes of the gaps in both achievement and behavioral outcomes. In particular, the contexts in which black and white children grow up differ dramatically. In 2003, 36 percent of black families and 15.5 percent of white families with children under age six lived below the poverty line (U.S. Bureau of the Census 2004). Differential rates of single parenting by race are even more startling, with 22 percent of white children and 53 percent of black children living with only one parent (Sigle-Rushton and McLanahan 2004). Due to both low family incomes among blacks and a segregated housing market (Massey and Denton 1993), many black children grow up in neighborhoods characterized by concentrated disadvantage. This family background profile puts black children at a disadvantage when it comes to positive child development by depriving them of resources (money, time, safe neighborhoods, quality child care, etc.) that promote child well-being and by increasing the likelihood that parents engage in less effective parenting practices (Sigle-Rushton and McLanahan 2004; Brooks-Gunn and Markman 2005).

While structural and economic factors can explain racial gaps in child outcomes, they cannot directly explain the disadvantaged position of boys relative to girls, since neighborhood and family context tend not to differ by gender within racial groups. To extend our understanding of sex differences in important outcomes in general as well as the origins of disadvantage among black males in particular, this paper examines two primary questions. First, do patterns of behavior problems among young children mimic patterns among older children and young adults: higher behavioral difficulties for boys than girls for both blacks and whites, with black boys having the most difficulty? Second, can we identify factors that account for sex differences in child behavior by race? In this investigation, I focus on two potential sources of these differences. I first explore whether boys and girls have different levels of exposure to important determinants of behavior problems during early childhood—neighborhood characteristics, family structure and parenting practices. I then test the hypothesis that regardless of level of exposure, those determinants affect boys and girls in different ways, producing gaps in important outcomes along the path through childhood.

Background

The Importance of Early Childhood Aggression

Aggression is generally defined as overt, intentional acts with the potential for harm (Coie and Dodge 1998). In young children, this includes behaviors such as demanding that needs be met immediately, destroying things and hitting (Achenbach and Rescorla 2000) and tends to be directed at siblings and peers. Aggression usually peaks during early childhood when children lack alternative strategies for expressing their needs and, across cultures, tends to be slightly higher in boys than girls by preschool age (Maccoby and Jacklin 1974). Children retreat from aggressive acts with age as the adults in their lives teach them prosocial strategies for meeting their needs (Coie and Dodge 1998).

Early childhood aggression has implications for outcomes across childhood and into adulthood. Not only do aggression and related behavior problems tend to show continuity from childhood forward, they link to negative outcomes in other domains. According to Moffitt (1993), those with life-course

persistent tendencies towards antisocial behavior exhibit such tendencies from early childhood, though particular manifestations change with age. For example, White et al. (1990) show that hyperactivity and aggression in preschool have strong associations with antisocial disorders at age 11. Buka and Earls (1993) identify childhood aggression as the single best predictor of juvenile delinquency.

The influence of early childhood behavior also spills over into domains that are not purely behavioral. Factors such as externalizing behavior problems (e.g. aggression) and difficult temperament predict high school completion, college attendance and unemployment in late adolescence and early adulthood (Caspi et al. 1998; McLeod and Kaiser 2004). Child behavior problems often initiate a cumulative, harmful process. For example, young children with unmarried parents tend to have more behavior problems like aggression than children with married parents (Osborne, McLanahan, and Brooks-Gunn 2004). Such externalizing behavior problems at a young age can put one on a path toward high school dropout (McLeod and Kaiser 2004); dropout, in turn, associates with incarceration (Pettit and Western 2004).

Social Influences on Child Behavior and Wellbeing

Neighborhoods

[FIGURE 1 ABOUT HERE]

Figure 1 displays paths from important social influences on child well being to early childhood aggression. That path originates with the neighborhoods in which young children and their families live. Spurred on by the publication of Wilson's *Truly Disadvantaged* (1987), researchers have shown that a broad range of neighborhood structural characteristics influence child development (Leventhal and Brooks-Gunn 2000; Harding 2003), often supporting theories of collective socialization. According to Jencks and Mayer (1990) these theories hypothesize that the availability and quality of neighborhood role models and monitors other than the child's own caregivers influence child outcomes. High levels of neighborhood poverty and unemployment, for example, are expected to depress a neighborhood's capacity to support the well being of its children and, consequently, associate with increases in child

behavior problems. A density of affluent or highly educated neighbors, on the other hand, is expected to improve outcomes.

The vast majority of econometric research on the impact of structural neighborhood characteristics on behavioral outcomes focuses on older children, often finding that living in a low SES neighborhood negatively influences behavior and mental health (Brooks-Gunn, Duncan and Aber 1997; Leventhal and Brooks-Gunn 2000; Earls and Carlson 2001). Two major experimental evaluations (the Gautreaux Project and the Moving to Opportunity [MTO] Demonstration) addressed the influence of neighborhood resources on well being by taking advantage of variation in the distribution of federal housing subsidies (Section 8 Vouchers). The Gautreaux Project found that youth who moved from inner-city to suburban areas experienced improved education and labor market outcomes (Rosenbaum 1995). In the MTO demonstration, girls who moved from high to low poverty neighborhoods (less than 10 percent) experienced improvements in their mental health and levels of risky behavior (Kling, Liebman and Katz 2007).

A small group of studies indicates that neighborhood characteristics may have a direct influence on younger children. Brooks-Gunn et al. (1993) find that having few managerial or professional workers in a neighborhood associate with increased behavior problems among 3-year old children. Chase-Lansdale and Gordon (1996) and Chase Lansdale et al. (1997) find that a variety of neighborhood structural characteristics (joblessness, ethnic diversity, summary measure of socioeconomic status) associate with child behavior problems among 3 to 4 year-old and 5 to 6-year-old children, but associations differ by the behavior problem under study, race and sex. Finally, Duncan, Brooks-Gunn and Klebanov (1994) find low-income neighbors associate with increases in externalizing behavior problems among 5-year-olds.

Structural characteristics do not alone account for neighborhood influences on child development. Recent research points to the importance of the social processes and interactions that take place within neighborhoods for understanding child well being (Sampson, Morenoff et al. 2002). Neighborhood processes such as social control, mutual trust and disorder are in some sense more proximate to child and

family experiences and, ultimately, well being. Focusing on adolescents and adults, a number of studies link disorder and low neighborhood cohesion with mental distress or depression (Cutrona et al. 2000; Ross 2000; Hill et al. 2005) risk-taking and affiliation with deviant peers (Kowaleski-Jones 2000; Brody et al. 2001; Lanctot and Smith 2001) and high risk sex (Cohen et al. 2000; Baumer and South 2001). In this study, I extend this body of research by exploring whether two aspects of community process influence aggression in early childhood: social cohesion and neighborhood disorder.

Family Structure

Though neighborhoods directly influence well being, in early childhood the family likely filters many neighborhood influences (Chase-Lansdale et al. 1997). As indicated in Figure 1, neighborhoods also exert an indirect influence on aggression through family structure and parenting practices. Family structure influences child well being through a number of mechanisms. In non-traditional families—families that do not include two biological or original adoptive parents—father absence depresses resources. First, financial constraints faced by families with an absent father (Holden and Smock 1991; McLanahan and Sandefur 1994; Avellar and Smock 2005) limit their ability to purchase environments and opportunities that promote positive child development. For example, economically insecure families have access to lower quality child care (Meyers et al. 2004) than higher income families and provide lower quality home environments (McLoyd 1998; Duncan and Brooks-Gunn 2000). Second, for single parents in particular, time constraints limit monitoring, play and other interactions that support child well being (Painter and Levine 1999; Amato 2005). Not only do single parents lack a second caregiver, but among mothers who work single mothers tend to work longer hours than married mothers (Sigle-Rushton and McLanahan 2004).

Non-traditional families are also likely to have experienced transitions in family roles, living arrangements or household composition. Both inadequate resources and instability create emotional upheavals for mothers and their children with potentially negative consequences for adaptive parenting behaviors and child well being. Meadows, McLanahan and Brooks-Gunn (2006) show that relationship

changes among mothers with young children associate with short term increases in maternal depression, while Cooper et al. (2007) find that family structure and change associate with increases in maternal stress. Stress and depression, in turn, harm parenting behaviors (McLoyd 1990; Elder et al. 1995; Duncan and Brooks-Gunn 2000). Ultimately, these strains influence child behavior. McLeod and Shanahan (1993) show that mothers' weak emotional responsiveness and frequent use of physical punishment explain the effect of poverty on children's behavior. Conger et al. (2002) find that child behavior problems sit at the end of a path from economic hardship to emotional distress to low nurturant parenting.

Research confirms that non-traditional family structures and instability negatively influence child behavior, though the vast majority of this work has focused on older children. In terms of family structure at a particular point in time, living with cohabiting parents, step-families or a single mother rather than with two married, biological parents associates with multiple behavioral and emotional problems (McLanahan and Sandefur 1994; Manning and Lamb 2003; Brown 2004; Osborne, McLanahan et al. 2004; Amato 2005). In terms of instability, studies have long shown that divorce negatively influences child behavior across the age spectrum (see meta analysis by Amato 2001). More recent work shows similar effects of transitions into and out of multiple types of unions (marriage and cohabitation with different partners; e.g. Capaldi et al. 1996; Wu and Thomson 2001; Fomby and Cherlin 2007). For example, Capaldi and Patterson (1991) find that multiple transitions associate with boys' adjustment problems in elementary school. Ackerman et al. (1999; 2002) find that both partnership transitions and residential instability associate with behavior problems among five-year olds and during early elementary school. Maternal emotional well being and the quality of parenting or the home environment mediate the negative impact of either a non-traditional family structure or transitions in family structure in many samples (Carlson and Corcoran 2001; Ram and Hou 2003; Cavanagh and Huston 2006). Only one study to date has focused on union transitions in early childhood, finding that while instability associates with increases in child aggression, maternal stress and parenting behaviors largely mediate its influence (Osborne and McLanahan 2007).

Parenting

As described above, parenting practices—the third social influence under investigation in the present study and the most proximate to child aggression—mediates the influence of both neighborhoods and family structure on child well being. An extensive body of research confirms that parenting practices influence behavior from early childhood forward (Bradley et al. 2001; Amato and Fowler 2002). In the present investigation, I am particularly concerned with how harsh or aggressive discipline techniques associate with child behavior problems. Developmental psychologists theorize that parents who use harsh techniques such as spanking or hitting have children who become more aggressive as a consequence of mechanisms like modeling, a notion consistent with research findings (Maccoby and Martin 1983; Eron et al. 1991; Baumrind 1993; Rothbaum and Weisz 1994; Lansford et al. 2004).

Differences by Race

Relative to whites, black children are at greater risk of behavior problems due largely to differences in the level of exposure to potentially harmful influences on well being. First, black children experience higher levels of neighborhood deprivation and disorder than white children (Massey and Denton 1993). Second, Black children are more likely to grow up with single parents and to experience family economic hardship than are white children (McLoyd 1998; U.S. Bureau of the Census 2004). Third, driven in part by the hardships this induces, black parents use less effective parenting practices than whites (Brooks-Gunn and Markman 2005). For example, blacks tend to score lower than whites on measures of home learning environment, learning stimulation and positive nurturing behaviors (Brooks-Gunn, Klebanov et al. 1996; Bradley et al. 2001; Brooks-Gunn and Markman 2005). Consistent with the notion that resource deprivation rather than race drives those differences, some researchers find that among socioeconomically comparable samples, black and white parents exhibit similar parenting practices (Hill and Bush 2001).

Differences by Gender

Sex differences in child behavior may result from both differences in exposure to determinants of aggression and differences in the way that those determinants affect boys and girls. Turning first to exposure, differences in parenting by child sex likely drive divergent outcomes for boys and girls. While neighborhood experiences likely differ for boys and girls as they move through elementary school and into adolescence (Ruble and Martin 1998; Crowder and South 2003), parents determine the level of neighborhood exposure in early childhood. Similarly, family structure, while highly divergent by race, does not differ by sex.

Differential treatment of boys and girls—gendered parenting practices—may influence the degree of stereotypical behavior children exhibit. In certain domains, parents socialize boys and girls differently (Huston 1983). For example, boys tend to receive more freedom from adult supervision and more encouragement for gross motor activities than girls. Parents also tend to be more accepting of anger responses from boys and fear responses from girls. As a result of differential treatment, boys may behave more aggressively than girls.

Though neighborhoods and family structure do not differ by child sex, both may shape differential parenting by child sex. First, neighborhoods may influence socialization within the family by shifting parents' expectations for the challenges and choices their boys and girls are likely to encounter. For example, Anderson (1999) chronicles the lives of black families in the impoverished Philadelphia inner-city. Parents are aware both of the volatility of life on the streets and that sons are more likely than daughters to be swept up in the volatility. Perhaps neighborhood deprivation and disorder give parents the sense that their sons need survival skills, leading them to toughen up their boys with an alternative set of parenting behaviors.

In terms of family structure, a mother's parenting practices or expectations for her children may respond to father absence. For example, when a son becomes "the man of the house," mothers may be more likely to approve of stereotypically male responses such as aggression and anger. On the other hand, father absence might lead to lower levels of aggression among boys (and higher among girls), given

that fathers are more likely than mothers to differentially socialize according to gender (Lytton and Romney 1991).

Sex differences in child aggression may also result from different behavioral responses by boys and girls to the same set of social influences. By age 3, the capacity for differential responses by sex already exists. Research on the developmental social psychology of gender indicates that even though children are not cognitively ready to grasp the permanence and physiology of gender until age 6 or 7, they exhibit sex-typed behavior by age 2, recognize their own and others' gender by age 3 and stereotype behavior according to gender between ages 3 and 6 (Fagot, Rodgers et al. 2000), p. 67). This early understanding of gender can affect child behavior. For example, young girls who can identify others' gender show less aggression than those who cannot, while boys' aggression is unaffected by their ability to label gender (Fagot et al. 1986; Fagot et al. 2000).

Neighborhood characteristics, family structure and parenting practices may all interact with child gender to produce differential outcomes by early childhood. Turning first to neighborhoods, socialization processes may differ by sex. For example, a neighborhood characterized by high male unemployment may be more detrimental to males than females if young boys are more inclined than young girls to envision men in their community as role models.

Despite evidence that boys are more vulnerable to the effects of an alternative or changing family structure than girls (Sigle-Rushton and McLanahan 2004), research has not yet verified why this might be the case. A number of possibilities exist. First, family structure may uniquely influence boys' and girls' behavior by shaping opportunities for observational learning. Children with unmarried parents tend to live with their mothers (Fields 2003) and consequently may have inconsistent exposure to male role models. Perhaps father absence generally or instability in the presence of adult male role models shapes boys' behavior in a maladaptive way by introducing stress. Boys' tendency towards higher levels of aggression (Maccoby and Jacklin 1974) may interact with the emotional difficulty created by an absent or changing male role model in a manner not apparent among girls, driving behavior problems to unexpected levels. On the other hand, father absence might lead to lower levels of aggression among boys given the

lack of a model for this stereotypically male behavior.

Why might parenting influence boys and girls in a different manner? As a consequence of socialization practices, children may internalize a gendered set of expectations that influences behavior regardless of how parents treat them in other domains. A brother and sister may react differently to the same punishment, because their parents socialized them into different gender roles.

Finally, males may have a biological predisposition towards aggression that certain neighborhood characteristics, family structures or parenting practices activate. According to Moffitt et al. (2001), the five percent of males in the Dunedin Longitudinal Study with early onset antisocial behavior were predisposed for such an outcome through neuro-cognitive, biological and genetic factors. In the rare situation that women exhibited early onset antisocial behavior, they were predisposed by social factors. Perhaps in young children, environmental risk factors that interact with male biology induce higher levels of aggression.

There is limited evidence that boys and girls have different behavioral responses to the same neighborhood. For example, in their exploration of the influence of a number of neighborhood structural characteristics on internalizing and externalizing behavior problems among 3 to 4-year-old and 5 to 6-year-old black and white children, Chase-Lansdale et al. (1997) find that a number of influences differ by both race and sex (e.g. preschool-age girls but not boys show higher levels of externalizing behaviors in response to affluent neighborhoods). In the MTO study, Kling and Liebman (2007) find quite different effects for males and females. Relative to controls, females in the experimental group show improvements in education and mental health and engage in less risky behavior. Males in the experimental group, on the other hand, are more likely to engage in risky behaviors and show no improvements in education.

A larger body of evidence indicates that boys and girls respond differently to the same family structure or transition (Sigle-Rushton and McLanahan 2004). According to Leve and Fagot (1997), children in single-parent families exhibit more problem behaviors when the parent and child are not of the same gender. Moffitt et al. (2001) find that changes in family structure and years with a single parent

have a stronger effect on antisocial behaviors among boys than girls. Yet others find no significant differences across genders in effects of family structure (Mistry et al. 2002). In a meta-analysis of the effects of father absence, Stevenson and Black (1988) show that both boys and girls in father absent families are more aggressive than children from intact families.

Finally, some findings support the notion that parenting practices differently influence boys' and girls' behavior. Shaw, Winslow and Flanagan (1999) find that maternal responsiveness predicts aggression in boys but not girls. McFayden-Ketchum et al. (1996) show that although maternal affection and coercion predict aggression in all children, they predict different aggression trajectories for boys and girls. In contrast, others find that parenting practices have the same effect on behavior of boys and girls (Moffitt et al. 2001).

Though the evidence is somewhat mixed, taken together, it seems that sex differences in early childhood aggression may result from different levels of exposure to and in different influences of determinants of aggression. In terms of exposure, I expect that parenting practices will differ by child gender for both blacks and whites. However, neither neighborhood characteristics nor family structure will differ. In terms of different influences according to child sex, given previous evidence that boys are more susceptible to changes in family structure, I expect that they will exhibit higher levels of aggression in response to father absence or family instability. Though both neighborhood characteristics and parenting practices may influence boys and girls in different ways, the degree and direction of that influence is unclear.

Data

The present investigation uses data from the Fragile Families and Child Wellbeing Study (referred to as "Fragile Families" from here forward), a stratified, multi-stage probability sample of 4,898 births that occurred between 1998 and 2000. Mothers in 20 large cities (populations over 200,000) were interviewed in person at the time of their child's birth (for a detailed overview of sample design, see Reichman et al. 2001). The study includes an over-sample of non-marital births. This investigation uses

data inclusive of marital and non-marital births.

Follow-up interviews were conducted by telephone when the child was approximately 1-year-old, 3-years-old and 5-years old. Response rates at follow-ups were 90 percent, 86 percent and 85 percent, respectively. A subset of mothers and children that took part in the years 3 and year 5 core interviews also completed a set of supplementary interviews at a later date that addressed child health and well being, parenting behaviors and neighborhood characteristics, among other things. Of the baseline sample, 67 percent of mothers participated in the year 3 supplementary interview and 61 percent participated in the year 5 supplementary interview. The present investigation focuses children whose mothers participated in at least the year 3 supplementary interview, who lived with their mothers at all interviews at least most of the time and who have complete data on all key predictors and control variables, resulting in a final sample size of 3071 children for the initial observation of the outcome and 2282 children for the second observation of the outcome. Subgroup analyses among blacks include 1472 children at year 3 and 1137 at year 5 while whites have 684 and 513 children at each age, respectively. An analysis of missing data patterns (not shown) shows that while characteristics are largely consistent between the baseline and the final samples, families included in this investigation appear slightly more advantaged than families who left the sample.

Outcome Variable

Child Aggression. At year 3, when children were on average 3.2 years old, I assess child aggression with a 19-item scale ($\alpha=.88$) based on Achenbach's 2000 Child Behavior Checklist (CBC) for 1 ½ to 5 year olds (Achenbach and Rescorla 2000). At year 5, when children were on average 5.4 years old, I assess aggression with an 18-item scale ($\alpha=.84$) based on Achenbach's 2000 CBC for 6 to 18 year-olds (Achenbach and Rescorla 2000). At both waves, interviewers read mothers a statement (e.g. my child destroys her own things or things belonging to others, argues a lot, gets into many fights, physically attacks people, is stubborn/sullen irritable) and asked them to indicate whether the statement was not/never true (0), somewhat/sometimes true (1), or very/often true (2) of their child. Eight items

overlapped at year 3 and year 5. For all observations, missing items were imputed to the mean of all other non-missing items for the same individual if at least half of the items had valid answers. At year 3, in two of the cities included in the sample, only 15 of the 19 items were included in the child assessment. For final scores, I take the mean of all items at each age.

Predictor Variables

Child Sex. I measure a child's sex with an indicator equal to one for boys and zero for girls. Approximately 53 percent of children are boys in the full sample as well as among blacks and whites.

Race-Ethnicity. Mothers reported their race and ethnicity at the baseline interview. The five categories include non-Hispanic white, non-Hispanic black, Mexican, non-Mexican Hispanic and all other races and ethnicities. For multivariate analyses that include the full sample, whites serve as the reference group.

Neighborhood Deprivation. Subsequent to the core Fragile Families interviews, characteristics of census tracts mothers occupied were linked to core data for 96.5 percent of those initially interviewed at baseline, 97.6 percent at year 1 and 95.0 percent at year 3. Information was drawn from the 2000 U.S. Census. The neighborhood deprivation measure is derived from a principal components factor analysis of seven socioeconomic characteristics of mothers' census tract of residence: percent of families living below the poverty level, percent of individuals age 25 or over with a high school degree, percent of households with children headed by females, percent of residents that are African American, percent of families on public assistance, percent unemployed and percent of housing occupied by renters. All tract characteristics loaded onto the same factor, with loadings ranging from .64 (percent African American) to .94 (percent in poverty). For most mothers, the census tract characteristics associate with her residence at the time of the year 3 core interview. For mothers who lack address information at year 3, I employ values of tract characteristics associated with her residence at the baseline or year 1 interview (3.6 percent of the final sample). Preliminary analyses indicated that the average level of child aggression shifts at approximately the 40th percentile score on the factor, rather than increasing with the full range.

Therefore, multivariate analyses include an indicator variable comparing those who live in less deprived neighborhoods (below the 40th percentile; reference group in multivariate analyses) with those in more deprived neighborhoods (at or above the 40th percentile).

Maternal Evaluations of Neighborhood Characteristics. I explore whether maternal experiences or evaluations of their neighborhoods influence child outcomes with two factors: social cohesion and the mother's exposure to violence. I measure social cohesion with a five-item mean scale ($\alpha=.80$) drawn from the Social Cohesion and Trust Scale (Sampson 1997; Sampson et al. 1997). During the year 3 supplementary interview, mothers evaluated the following statements on a Likert-type scale ranging from 1 (strongly agree) to 5 (strongly disagree): "People around here are willing to help their neighbors," "This is a close-knit neighborhood," "People in this neighborhood can be trusted," "People in this neighborhood generally don't get along," and "People in this neighborhood do not share the same values." Items were coded such that higher scores indicate greater cohesion. Mothers that responded to at least four of the five items have a value for this scale.

Mothers described their exposure to violence in the past year during the year 3 supplementary interview. Questions were drawn from the *My Exposure to Violence* (My ETV) scale, a structured interview initially designed to assess child and youth exposure to violence as a witness or victim (see for example Selner-O'Hagan et al. 1998). Interviewers instructed mothers that "[We] do not want to know about violence carried out by your circle of family or loved ones. Rather, we are interested in learning only about the violence carried out by people outside of your circle of family or loved ones, no matter who the victim might have been." Mothers responded to questions about their exposure to four acts of violence: beatings (witness or victim), attacks with a weapon like a knife or bat (witness or victim), shootings (witness or victim) or killings (witness only). Mothers reported the frequency of each event in the past year: never, once, 2-3 times, 4-10 times or more than 10 times.

It is important to note that questions do not solely address mothers' neighborhoods. However, evidence indicates that responses to My ETV associate with one's place of residence. Diagnostics conducted during the development of the scale showed that actual neighborhood level violence was

significantly related to subjects' exposure to violence in the past year and that living in a high versus low crime community served as a risk factor for witnessing violence (Selner-O'Hagan et al. 1998).

Because the survey did not include all My ETV items, standard approaches to scoring could not be employed. To address the full range of information available, I employed a scoring scheme that addresses both severity and frequency and differentiates witnessed violence from being the victim of violence. I employed the Wolfgang-Sellin Severity (WSS) Index (Sellin and Wolfgang 1978) to estimate the following weights: 4.5 points for a beating without a weapon, 9.5 points for a beating with a weapon or a shooting and 30 points for a killing (witness only). To address the frequency of each act, I coded each response category as follows: never (0), once (1), 2-3 times (2.5), 4-10 times (7) and more than 10 times (11). For total "witness" and "victim" scores, I multiplied the frequency of each act by its severity score and summed across items. For the four-item "witnessed violence" scale, $\alpha=.75$. For the three-item "victim of violence" scale, $\alpha=.85$.

Family Structure. Mothers reported their relationship status with the child's biological father or the presence of a new partner (cohabiting or married) during each core interview. I define five family categories that address structure and stability up to and including the year 3 interview: 1) the child lives stably with biological parents from birth to year 3 (reference category in multivariate analyses), 2) the child lives stably without a biological or social father in the home, 3) the child only experiences a partner (biological father or new partner, referred to as a "social father") moving in with the mother between birth and year 3, 4) the child only experiences a partner moving out between birth and year 3 and 5) the child experiences multiple moves by a partner into or out of the household. I am distinguishing between the exit of a partner from and entry of a partner into the household, because the upheaval each creates may be quite different.

Preliminary analyses also explored whether stably living with unmarried biological parents (cohabiting) influences child aggression in a manner distinct from stably living with married biological parents. No differences were found, so I collapsed stably cohabiting and married parents into a single group.

Parenting. Mothers describe their approach to discipline by responding to 14 of the 22 questions included in the parent-child version of the Conflict Tactics Scale (CTSPC; Straus et al. 1998).

Interviewers asked mothers how many times in the past year they engaged in various types of nonviolent discipline, psychological aggression and physical discipline towards their children. The seven response categories included once, twice, 3-5 times, 6-10 times, 11-20 times, more than 20 times and never.

As described by Straus et al. (Straus et al. 1998), the 4-item nonviolent discipline subscale ($\alpha=.73$) measures the use of discipline techniques seen as an alternative to corporal punishment (e.g. explained why something was wrong, time out). The 5-item psychological aggression subscale ($\alpha=.52$) measures “verbal and symbolic acts by the parent intended to cause psychological pain or fear on the part of the child” (Straus et al. 1998), p. 252; e.g. threatened to spank or hit but did not actually do it, swore or cursed at child). The 5-item physical discipline subscale ($\alpha=.61$) measures various forms of corporal punishment (e.g. spanked, pinched, shook). For the former two subscales, Fragile Families includes all CTPSC questions. For the physical discipline subscale, Fragile Families eliminates the eight questions that address severe physical maltreatment (e.g. threw or knocked the child down, threatened with a gun or knife; the CTPSC refers to the complete subscale as “physical assault”).

Multivariate analyses include summary versions of the nonviolent discipline and psychological aggression subscales that addresses annual frequency of the various acts and a dichotomous version of the physical discipline subscale that indicates whether children experienced any of this discipline technique in the past year. Response categories were coded to the midpoint of each category to indicate the estimated annual frequency of the event (0, 1, 2, 4, 8, 15 and 25 times) and all items were summed. Preliminary analyses included a version of the physical discipline subscale that addressed frequency of use. Both versions of the variable show the same positive association with aggression. However, once psychological aggression and nonviolent discipline are controlled, the explanatory power of physical discipline for aggression is stronger for the dichotomy. To address missing items, I followed procedures recommended by Straus (2004) specific to each subscale.

Control Variables

Child Factors. I control for four characteristics of children that may associate with both parenting behaviors and their levels of aggression. I measure child age in years at the time of the year 3 and 5 supplementary surveys (when mothers reported child behavior). In multivariate models, age is centered at the average initial age for the sample, approximately 3.2 years old, by subtracting 3.2 from each child's age. I control for low birth weight with an indicator equal to one if the child weighed less than 5 pounds-8 ounces (2500 grams) at birth, the standard cutoff used to determine low birth weight status. Both twin status and parity (whether the child was first born) are also addressed with dichotomous variables.

Maternal and Household Factors. Given the importance of family background to child behavior problems, I control for a variety of maternal and household characteristics in multivariate analyses. I measure mother's age at the child's birth in years. I measure maternal education with an indicator variable differentiating mothers with less than a high school education (the reference category) from those with a high school degree, GED or more. Preliminary analyses used separate indicators for mothers with some college education and a college degree or more but found no differences in key results. To address nativity, I include an indicator equal to 1 if a mother reports she was born outside of the United States.

As described above, mothers report child behavior. Maternal characteristics such as depression or stress might influence her evaluation of child behavior. To address this issue, I include an indicator equal to one if a mother is a probable case of depression based on responses to the *Composite International Diagnostic Interview - Short Form (CIDI-SF), Section A* (Kessler et al. 1998) during the year 3 core interview. The short form of the CIDI interview takes a portion of the full set of CIDI questions and generates from the responses the probability that the respondent would be a "case" (i.e., a positively diagnosed respondent) if given a full CIDI interview.

Household income, also measured with a series of indicator variables, was reported by mothers at the third wave of core interviews. If mothers were unable to provide an exact number, they identified a possible range. Income variables differentiate households who made less than \$15,000 (reference group

in multivariate analyses), between \$15,000 and \$40,000, and over \$40,000 in the year prior to the interview. Mothers who did not report household income are coded zero for all income indicators and one for an “income missing” variable. Given the degree of missing information regarding income, any income effects should be interpreted with caution. Preliminary multivariate analyses showed that using more refined income categories, using a continuous measure that imputed income for mothers who did not report or dropping all mothers with missing income data has no notable influence on key results.

Methods

I begin by presenting descriptive statistics for the outcome, predictor and control variables (Tables 1 to 4) for the full sample of children as well as for blacks and whites. In order to explore whether differences in exposure to certain factors might help explain sex differences in child aggression, I present descriptives by sex and identify any significant differences.

Next, I conduct multivariate analyses. Unless otherwise noted above, I employ listwise deletion to deal with missing data. I estimate three-level hierarchical linear models (HLM; Raudenbush and Bryk 2002) using HLM Software Version 6.2a (Raudenbush, Bryk and Congdon 2005) to account for both the nesting of observations over time within children and the nesting of children within neighborhoods. Children’s aggression and their change in aggression with age are modeled as a function of neighborhood characteristics, family structure, parenting techniques and control variables.

The level 1 model takes the following form:

$$(1a) \text{Agg}_{ijt} = \alpha_{ij} + \beta_{ij}(\text{Age}_{ijt}) + e_{ijt}$$

Child i ’s aggression score in neighborhood j at time t (measured by the child’s age in years) is a function of the child’s initial level of aggression α_{ij} , a slope β_{ij} that indicates how much aggression varies with age (the aggression score is a linear function of age) and an individual error term e_{ijt} (assumed normally distributed with mean zero and variance σ^2_e). Note that α_{ij} can be interpreted as the child’s initial level of aggression, because for all analyses, child age has been centered at the average initial age for the full sample, approximately 3.2 years old, by subtracting 3.2 from each child’s age.

At level 2, the person-level model, I account for how the growth parameters vary across individuals. The level 1 intercept and slope become outcomes, and the model takes the following form:

$$(1b) \alpha_{ij} = \gamma_{0j} + \gamma_{1j}x_{ij} + \gamma_{2j}x_{ij} + \dots + r_{\alpha ij}$$

$$(1c) \beta_{ij} = \lambda_{0j} + \lambda_{1j}x_{ij} + \lambda_{2j}x_{ij} + \dots + r_{\beta ij}$$

The average initial level of aggression and the change over time in aggression in neighborhood j are functions of a series of variables representing child sex, neighborhood disorder and cohesion, family structure, parenting practices, control variables and random effects ($r_{\alpha ij}$ and $r_{\beta ij}$ which are assumed to be normally distributed with zero means, variances τ_{r11} and τ_{r22} , respectively, and covariance τ_{r12}). The variance of the random effects represents the heterogeneity of the children's level of and change in aggression around the average. Recall that neighborhood disorder and cohesion variables are based on maternal reports of their own experiences and evaluations of their neighborhoods. Consequently, these variables are treated as individual characteristics (rather than neighborhood-level measures).

γ_{0j} is the average level of aggression at age 3.2 and λ_{0j} the slope (average annual change) for the reference child in the j^{th} neighborhood. Note that the reference child experiences the zero-value for all variables included in the analysis. All fixed effects associated with the slope shift the annual change in aggression.

At level 3, the neighborhood level, the level-2 parameters γ_{0j} and λ_{0j} are viewed as functions of neighborhood deprivation. The average initial level is additionally assumed to vary randomly across neighborhoods (random effect u_{0j} assumed to be normally distributed with mean zero and variance τ_{u11}) while the slope and the influence of all covariates are fixed across neighborhoods. The neighborhood deprivation indicator is coded such that the reference child lives in neighborhood with higher resources. Despite having a sample size sufficient for exploring multiple influences on child aggression, I only observe child aggression at two points in time. Consequently, the data contain insufficient information to estimate all the variance components important to child aggression. To save the degree of freedom, I supply a known estimate of measurement error variance to the HLM program rather than estimating the variance from the data. In the HLM software, this is accomplished by weighting the

outcome scores by their reliability (i.e. include a precision weight; see Goldberg and Sayer 2006 for an example of this approach).

For multivariate analyses, I begin with a series of models that explore the influence of key predictor variables and whether those influences follow the paths identified in Figure 1. I first present findings for the full series of models from the sample that includes children of all races and ethnicities (Table 5). In table 6, I present results from the full model for blacks and for whites—the two groups with a sufficient sample size for separate analyses—and compare coefficients across models.

I present analyses for both the full sample and by race subgroup for a couple of reasons. Sub-sample analyses have a limited degree of power for detecting effects and contain more limited variation in census tract characteristics, particularly for whites. On the other hand, because of extensive segregation in the United States (e.g. Massey and Denton 1993), blacks and whites often live in quite different neighborhoods with regard to the tract characteristics under study here. Further, evidence indicates that other variables under investigation here might have different meanings or consequences in each group, particularly parenting practices (e.g. Deater-Deckard et al. 1996; Deater-Deckard and Dodge 1997; Raver, Gershoff and Aber 2007) and, consequently, influence black and white children in different ways. By presenting both sets of models, I maximize my ability to detect important influences while allowing for potentially different patterns of effects by race.

Next, I explore whether a child's sex moderates the influence of neighborhood characteristics, family structure or parenting practices on child aggression. The majority of the interactions under exploration are added to the person-level model (level 2). I explore the moderating role of child sex for neighborhood deprivation with a cross-level interaction between deprivation at level 3 and sex at level 2. Given the large number of interactions under consideration, I take an iterative approach. First, I add interactions between sex and key predictors one at a time (first for the average initial level of aggression, and second for change over time in aggression). Next, I add interactions in substantive groups (neighborhood, family structure, parenting). Finally, I include all interactions in the same model. With this process, I generally avoid missing important relationships hidden by suppressor effects and identify a

group of interactions robust to various specifications. Below, I focus primarily on robust interactions in each sample (Table 6, Figure 2). To determine whether child sex influences outcomes for blacks and whites in different ways, I test whether interaction terms differ by race.

Results

Descriptive Statistics

Table 1 presents descriptive statistics for the full sample and Table 2 presents descriptives for blacks and whites. The top portion of each table shows the average level of child aggression when the children were 3 and 5 years old for both the full sample and for the subsamples of black and white children, as well as the change over time between the two observations. As expected, boys exhibit higher levels of aggression than girls at both time points and for all groups, though among whites the difference is only marginally significant at year 3. Also at both observations, black boys are the most aggressive group, significantly more so than all girls and marginally more so than white boys (a two-tailed comparison of black and white boys is not significant). As expected, aggression declines over time for all groups (child aggression tends to peak around age 3 and decline thereafter; Coie and Dodge 1998). Black boys and white girls experience the largest declines and black girls the smallest, but none of the subgroups significantly differ in levels of change with age.

[TABLE 1 ABOUT HERE]

Tables 1 and 2 next present descriptive statistics for neighborhood characteristics. As expected, neither tract-level deprivation nor maternal reports of social cohesion and experiences of violence differ by child sex for the full sample or blacks and whites. Across race, all mean values differ significantly. Blacks are more likely to experience deprivation than whites (80 percent of blacks fall above the 40th percentile score on the neighborhood deprivation factor for the full sample while only 19 percent of whites do). Black mothers report lower levels of social cohesion than white mothers (mean=3.27 versus 3.87). Black mothers are also more likely to be both a witness and victim of violence. On average, blacks report witnessing the equivalent of four beatings without a weapon or two beatings with a weapon

in the last year (mean=18.99), while whites report witnessing less than one beating with a weapon (mean=3.88). In terms of victimization, on average blacks experienced about half of a beating without a weapon in the last year (mean=2.09) while whites experienced 13 percent of beating without a weapon (mean=.60).

[TABLE 2 ABOUT HERE]

We next see that family structure and stability between a child's birth and age 3 do not differ significantly by child sex, but they do by race. Among white children, 65 percent live stably with their birth mother and father compared to 26 percent of blacks. Conversely, 8 percent of whites and 25 percent of blacks live stably with a single mother (no biological or social father in the household). Black children are also more likely to experience instability in their first three years. Among blacks, 18 percent of children experience a partner (biological or social father) moving into their household and 15 percent experience a partner moving out of their household, compared to 8 and 10 percent of whites, respectively. Similarly, 16 percent of black children experience multiple moves in and out of the household by mothers' partners compared to 8 percent of white children.

A number of gender and race differences emerge in discipline practices. On average, mothers harshly interact with boys more often than with girls in the year prior to the interview. For physical discipline, the parenting technique used with the lowest frequency in this sample, sex differences are significant in both the full sample and for blacks and whites. Black mothers reportedly used physical discipline for their boys 20.6 times in the past year compared to 17.5 times for their girls. For whites, mothers used physical discipline 16.1 times on their boys and 12.7 times on their girls. When physical discipline is dichotomized, comparing those who experienced any with none at all, there is a sex difference in the full sample (84 percent of boys compared to 81 percent of girls) but none by race. For psychological aggression, sex differences are significant among all groups. On average, black and white mothers were psychologically aggressive towards their boys 28.6 and 25.2 times in the past year, respectively, and 26.3 and 22.0 times, respectively, towards their girls. Levels of nonviolent discipline, a generally adaptive form of discipline and the most common parenting technique in this sample (used by

99.9 percent of mothers), also differ by sex with boys receiving the highest levels. However, the difference only reaches significance in the full sample.

Significant differences in parenting practices also emerge by race. Black mothers are more likely to employ physical discipline and psychological aggression than white mothers, while white mothers are more likely to employ nonviolent discipline techniques. Overall, black boys experience significantly more physical discipline and psychological aggression than any other group and white boys experience significantly more nonviolent discipline.

Tables 3 and 4 presents descriptive statistics on control variables for the full sample and by race, respectively. Two-tailed t-tests indicate that there is only one, marginally-significant sex difference in the full sample: Mexicans make up a greater proportion of girls than boys. Focusing on Table 4, a number of race differences emerge. Blacks and whites differ in their rates of low birth weight (higher for blacks) and first born children (higher for whites). White mothers also have higher levels of education, are older at the time of the birth, have higher household incomes and are less likely to have missing household income information.

[TABLE 3 ABOUT HERE]

[TABLE 4 ABOUT HERE]

Hierarchical Linear Models

Main Effects

Full Sample

Table 5 presents mediating models exploring main effects of key predictor variables on the average initial level of child aggression and the average change with each year of age for the combined sample. Model 1 explores the effect of neighborhood deprivation, model 2 explores the influence of maternal neighborhood experiences and model 3 combines all four neighborhood variables. Model 4 explores the influence of family structure, and model 5 explores the influence of parenting. Models 6 and 7 combine neighborhood, family structure and parenting characteristics. All models include the complete

set of control variables laid out in table 3. The upper half of the table presents effects on the initial level of child aggression while the lower half explores how those effects change over time.

[TABLE 5 ABOUT HERE]

Relationships of predictor variables with the initial level of child aggression largely follow the path laid out in Figure 1. We see in model 1 that neighborhood deprivation has a significant, positive effect on the initial level of child aggression, increasing it by about .058 points (16 percent of a standard deviation). However, both maternal experiences of neighborhoods in particular and parenting practices to a lesser extent mediate its influence, reducing the effect to .037 points (10 percent of a standard deviation) in model 7.

Turning to maternal reports of neighborhood experiences, models 2 and 3 show that both social cohesion and violence influence child aggression. Mothers who report higher social cohesion have children with lower aggression; each point of increase in the social cohesion scale associates with a .056 point reduction in aggression (16 percent of a standard deviation). However, parenting practices mediate the influence of cohesion, reducing the effect to .040 points (11 percent of a standard deviation) in model 7.

According to model 2, a mother's victimization by violence has no significant effect, but witnessing violence in the past year increases initial aggression by .0009 for each point of increase in the violence scale. Though a highly significant effect, the full force of violence is reserved for children whose mothers witness at the highest levels. A mother who witnesses violence at the mean level—approximately 12 points—has a child whose initial aggression is .011 points higher than a child whose mother does not report witnessing violence in the past year (63 percent of the children in this sample), only 3 percent of a standard deviation. At the upper tail of the distribution for witnessing violence—the 99th percentile (173 points)—aggression increases by 43 percent of a standard deviation. With the introduction of family structure and parenting variables into the model, this effect falls by 22 percent, to .0007 points.

Turning to family structure, model 4 indicates that stably living in a single mother family increases initial child aggression by .068 points (19 percent of a standard deviation) relative to children in stably married or cohabiting households, an effect that falls to .057 (16 percent of a standard deviation) when neighborhood factors are also controlled. Controlling for parenting behavior has little further influence on the magnitude of this effect. Instability, on the other hand, appears to have little influence on aggression. Focusing on model 7, it appears that having a biological or social father move into the household between birth and age three associates with a .033 point marginally significant increase in aggression, 9 percent of a standard deviation. However, this effect reaches marginal significance only after controlling for parenting techniques.

Models 5 and 7 address the influence of parenting practices on child aggression. The experience of any physical discipline and higher levels of psychological aggression and non-violent discipline from mothers associates with an increase in initial child aggression. Controlling family structure or neighborhood characteristics has very little influence on these effects. Beginning with physical discipline in model 7, it appears that a mother who used any of these techniques on her child in the year prior to the interview has a child whose aggression is .106 points (29 percent of a standard deviation higher) than a child whose mother does not use physical discipline. A mother's psychological aggression also has a strong, sizable influence on child aggression. A child whose mother employs the average level of psychological aggression (24 instances in the past year) is .12 points more aggressive than a child whose mother is never psychologically aggressive, approximately one-third of a standard deviation. At the 90th percentile, that gap increases to two-thirds of a standard deviation. Finally, non-violent discipline, a largely adaptive parenting style, also associates with an increase in initial child aggression. Moving from the 25th percentile (33 instances in the past year) to the mean (56 instances) associates with a .03 point (8 percent of a standard deviation) increase in child aggression.

When modeling the influence of parenting behaviors on child behavior, reverse causality—that the child's behavior elicits a certain type or quantity of parenting techniques—becomes a concern. To address this issue in this sample, I conducted a supplementary set of analyses (not shown) that controlled

for mothers' reports of child temperament, a measure of one's stable behavioral traits, when the children were about one year old. In main effect models for the full sample of children as well as for race subgroups, the magnitude and significance of parenting influences on both the initial level of aggression and change over time in aggression remains virtually the same. The role of temperament in models that include interactions with child gender are discussed below.

Looking across the seven models in the top half of table 5, one can trace how the reported gender difference in child behavior changes in response to various controls. In all models, the gender difference remains significant. Until parenting behaviors are addressed, the magnitude of that difference, .045 points or 12.5 percent of a standard deviation, remains basically the same. Once I address discipline techniques, that difference falls by almost half to .025 points or 7 percent of a standard deviation, indicating that part of the observed gender difference in aggression can be attributed to children's experiences of discipline.

The bottom half of table 5 presents how effects on aggression change with child age. Beginning with neighborhood variables, models 1 through 3 show that the influence of neither neighborhood deprivation nor victimization by violence shift over time. The effects of social cohesion and witnessed violence, on the other hand, decrease in magnitude as children grow. The downward influence of social cohesion on initial aggression falls by .007 points with each year of age, a 17 percent decline in the initial negative association. Similarly, the effect of witnessed violence on initial aggression reported above (.0007) declines by .0001 points each year. However, this fade out of both the social cohesion and witnessed violence effects goes to insignificance once I include parenting behaviors in the model.

While none of the family structure effects change over time, two of the parenting effects do: psychological aggression and nonviolent discipline. In both cases, the upward influence on aggression of parenting experienced at around age 3 falls somewhat as children age. The .0048 point increase in child aggression with each act of psychological aggression declines by .0013 points with each year of age. For nonviolent discipline, the .0014 point increase in aggression with each instance declines by .0003 with each year of age, a 21 percent decline in the effect per year. While the over-time effect of physical

discipline is also negative, indicating a decline in the magnitude of its influence of child aggression, the coefficient is not significant.

Finally, tracing the influence of child gender across table 5, we see that the male effect is never significant. The male-female gap in aggression is basically established by the time the children are 3 years old.

Blacks and Whites

In Table 6, I present results from the full model (model 7 in Table 5) for blacks and whites and explore whether effects differ significantly by race. Note that effects have been organized by variable rather than by timing (initial level versus annual change) as in Table 5. Though patterns are similar, results among both blacks and whites diverge in a few instances from those found for the full sample of children.

[TABLE 6 ABOUT HERE]

Beginning with neighborhood deprivation, though the magnitude of the effect for both blacks and whites is similar to the effect seen in the full model, it reaches significance in neither subgroup, perhaps due to the lower level of power available to detect effects. The influence of maternal neighborhood experiences, on the other hand, appears to diverge among blacks and whites, but effects are significantly different in only one case. First, for both blacks and whites, the highly significant effect of social cohesion remains, but the effect is much larger among whites and significantly so. The marginally significant fade out of the effect among whites seen in the row labeled “Annual Change”—.011 points with each year of age—does not wipe out the gap between blacks and whites in the positive influence of cohesion on aggression.

For both blacks and whites, mothers who witness violence have children with higher aggression, though the upward influence declines somewhat with each year of age. For whites, the “Initial Level” effect only reaches marginal significance and the fade out over time is not significant. Estimated effects of white and black mothers’ experiences of victimization differ but not significantly so. Among blacks,

mothers who have been victimized by violence actually report lower levels of child aggression ($b=-.0019$, $SE=.0006$), though that depressive effect declines somewhat ($b=.0005$, $SE=.0003$) each year. Perhaps children whose mothers have been victimized try or are forced to compensate for their mothers' trauma by exhibiting less aggression. Alternatively, mothers who have experienced violence may be somewhat numbed to their children's aggressive behaviors. Among whites, victimization effects do not reach significance.

Moving to family structure, none of the effects among blacks and whites significantly differ, though influences appear to diverge. Among blacks, living stably with a single mother rather than married, biological parents has a marginally significant, positive influence on aggression of .048 points (compared to .056 points in the full sample), about 12 percent of a standard deviation. No such effect appears among whites. For both groups, neither having a partner move in nor having a partner move out between birth and year 3 associates with child aggression. White children who have experienced multiple shifts in the household structure owing to mothers' partners show an increase in aggression over time of .044 points per year, about 13 percent of a standard deviation.

Among blacks and whites, though magnitudes differ slightly, the pattern of significant effects of discipline practices on both the initial level of aggression and the annual change in aggression are parallel to the full sample except in one case: the annual change effect for nonviolent discipline is not significant among blacks. Parenting effects significantly differ by race in only one case: the upward influence of nonviolent discipline on the initial level of aggression is larger among whites than blacks.

Looking at the bottom of Table 6, it appears that the full set of main effects explains any gender differences in aggression for whites but not blacks. Among blacks, boys are about .041 points or 11 percent of a standard deviation significantly more aggressive than girls. Among whites, the .014 difference (4 percent of a standard deviation) is not significant, due in large part to the inclusion of parenting practices in the model. For both blacks and whites, child gender does not have a direct effect on the annual change in aggression.

Interaction Effects

Full Sample

Table 7 presents estimates of interaction effects from a model for the full sample of children to explore whether key predictor variables influence boys and girls in a different way. Effects come from a single model that also includes all main effects (including control variables) addressed in the full model presented in table 5. The model only includes significant or marginally significant interactions. Figure 2 shows the trajectory of effects included in table 7 by age and gender from the average initial age in this sample (3.2 years old) to the average age at the second observation of aggression (5.4 years old).

[TABLE 7 ABOUT HERE]

Apparently, child gender does interact with certain aspects of neighborhoods, family structure and parenting behaviors in producing child aggression. First, boys and girls are influenced in a different manner by mothers' victimization by violence. As the first panel in Figure 2 indicates, for girls, initial aggression decreases in response to victimization. With each point of increase in the violence scale, aggression falls by .0019 points. At the average level of victimization (1.52 points), this translates into an extremely small decrease of about 1 percent of a standard deviation. At the uppermost-tail of the distribution (99th percentile), where violence scores exceed 30, girls' aggression falls by 17 percent of a standard deviation or more. Boys' initial aggression, on the other hand, is not influenced by victimization; the interaction between gender and victimization ($b=.0028$, $SE=.0009$) offsets the negative main effect operating among girls. Owing to a marginally significant interaction between child gender and victimization, the influence of victimization on child aggression converges towards zero for boys and girls by the time they are around 5 years old.

[FIGURE 2 ABOUT HERE]

While victimization initially has a stronger influence on girls, having a partner move into the household between birth and age 3 has a stronger influence on boys. Table 7 and the second panel in Figure 2, "Move In," show that while girls are initially unaffected by this change in household structure, boys have a sizable increase in aggression: .082 points (23 percent of a standard deviation) greater than

girls in a similar household and .07 points (19 percent of a standard deviation) greater than children who live with their married, biological parents. Following the trajectories to age 5.4 shows that the gap in the effect between boys and girls subsides with time. At the latter age, aggression among children who have experienced a partner move in exceeds aggression among children with stably married parents by .02 points for girls and .04 points for boys, 5 percent and 9 percent of a standard deviation, respectively.

The influence of all three discipline techniques under investigation apparently relates to child gender. Physical discipline associates with a smaller increase in initial aggression for boys than girls (a marginally significant difference of .058 points, 16 percent of a standard deviation). As children age, that initial gap remains stable; the influence of early physical discipline shows the same non-significant decline for both groups. Though mothers' psychological aggression associates with increases in initial aggression for both boys and girls, its effect on boys' initial aggression exceeds the effect on girls by about one-third ($b=.0013$, $SE=.0007$). For both groups, the upward pressure on aggression moderates with time, though the decline in the effect is steeper for boys than girls. By the second observation of aggression, early maternal psychological aggression influences boys and girls in a similar manner. Finally, mothers' use of nonviolent discipline associates with a larger increase in initial aggression for boys than girls; the marginally significant interaction with child gender ($b=.0007$, $SE=.0004$) indicates that each instance of nonviolent discipline has an effect that is 70 percent larger for boys than girls. As in the case of physical discipline, the initial gap remains stable as children age; the significant, annual decline is the same for both groups ($b=-.0003$, $SE=.0001$).

All models were also run controlling for child temperament to explore a potential role for reverse causality (not shown). While parenting continues to influence boys and girls in a different manner, certain results should be interpreted with caution. Once temperament is controlled, the marginally significant interaction between physical discipline and child gender for the initial level of aggression falls to insignificance, though the sign remains the same. For psychological aggression, the interaction with child gender for the initial level becomes non-significant, but the difference in the annual rate of change remains. For nonviolent discipline, the interaction with child gender actually strengthens.

Blacks and Whites

I next explore interactions with child gender in separate models for blacks and whites to allow for the possibility that gender may play a different role in each group. In order to test whether interaction effects differ for blacks and whites (i.e. whether sex differences in effects of predictor variables on initial level or change with age differ by race), the models in Table 8 include interactions that are significant for either blacks or whites. Effects are consistent with models that only include significant interaction effects for each group.

[TABLE 8 ABOUT HERE]

As Table 8 conveys, for both blacks and whites, family instability and parenting practices influence boys and girls in different ways. Among blacks, child sex moderates the influence of having a biological or social father move into the household between birth and age 3 and mothers' use of physical discipline. Among whites, child sex moderates the effect of having a biological or social father move out of the household between birth and age 3 as well as of physical and nonviolent discipline. Also among blacks, child gender moderates the influence of mothers' victimization by violence on the initial level of aggression. As indicated in the final column of the table ("B-W Difference?"), only two of those interactions differ by race in this specification. First, the sex difference in the influence of having a partner move out for whites exceeds the (non-significant) difference among blacks. Second, the sex difference in the effect of physical discipline on the initial level of child aggression is larger for whites than blacks.

[FIGURE 3 ABOUT HERE]

Figure 3 displays the trajectories of those effects by race and sex from the average initial age in this sample (3.2 years old) to the average age at the second observation of aggression (5.4 years old). Turning to the first panel in the figure, "Victim of Violence," it appears that aggression among black and white girls initially falls in response to victimization, black boys are unaffected and white boys show a sizable increase. Over time, this pattern remains virtually the same. However, none of the effects are significant among whites, perhaps due to the more limited levels of victimization experienced in this

group. Moving to the second panel, “Move Out,” we see that while black boys and girls are virtually unaffected by this shift in the household, white boys experience an increase in initial aggression (.072 points, 21 percent of a standard deviation) and white girls experience a decrease relative to children who live stably with both parents. While the gap between white boys and girls is large and significant, the negative main effect showing a decrease in aggression among girls is not significant.

The third panel in the figure shows that a “Move in” by a father or new partner is most harmful to black boys at 3.2 years old. That pattern changes with age. The negative influence for black boys declines, with a “move in” influencing black boys and girls similarly by the time they are 5.4 years old. For both white boys and girls, the harmful influence of a move in increases over time, with white girls ultimately experiencing the largest increase in aggression among the four subgroups by 5.4 years of age and black girls the smallest. However, none of the coefficients are significant for whites.

The fourth panel in Figure 3 shows that the influence of a mother’s use of physical discipline associates with a large increase in aggression for black and white girls at all ages (approximately one-third of a standard deviation at age 5), no influence for white boys and a declining influence with age for black boys. The final panel in Figure 3-2 shows that the upward effect of nonviolent discipline on child aggression declines for white and black girls and remains stable for white and black boys over the two year period. At age 5.4, white boys continue to experience the largest increase in aggression resulting from nonviolent discipline, followed by black boys. Girls, on the other hand, ultimately show no change in aggression in response to nonviolent discipline. This is not surprising given the adaptive nature of nonviolent discipline techniques. Controlling for child temperament has little influence on significant results reported here.

Discussion

The present investigation addressed three primary questions. First, do patterns of behavior problems in young children by race and sex mimic patterns seen in older children and young adults for outcomes such as school suspension and criminal behavior? At both age 3 and age 5, black and white boys surpass their female counterparts in levels of aggression. Additionally, black boys are more

aggressive than whites of either sex and at both ages, though black boys are only marginally significantly more aggressive than white boys.

Though modest in size, these gaps by race and sex merit concern. One's position in the hierarchy of behavior problems at any point in childhood may boost the likelihood of negative outcomes over time, no matter the absolute level of behavior problems. For example, Entwisle and Hayduk (1992) find that teachers' negative evaluations of children's classroom behavior lead to lower grades. Regardless of family background, boys receive lower conduct marks (Entwisle, Alexander and Olson 1997). If teachers evaluate students relative to one another, more aggression, regardless of how much more, may be adequate to establish the increased risk for poor school performance or relegation to special education.

Understanding Differences in Exposure by Gender: Discipline Practices

The second primary question in this analysis addressed what might bring sex differences about. Modest support emerges for both the hypothesis that differences in exposure to and differences in influences of determinants of aggression play a role in gaps by child sex. First, boys have higher levels of exposure to parenting practices that multivariate analyses show associate with increased aggression at age 3. In the full sample, boys experienced higher levels of physical discipline, psychological aggression and nonviolent discipline than girls. Among blacks and whites, boys also experienced higher levels of all three parenting practices than girls, though differences in nonviolent discipline did not reach significance.

Why might mothers use different parenting practices for boys and girls? First, parents may differently perceive boys and girls or have different expectations for their behaviors and capacities. Evidence in a variety of areas including behavior, motor ability, achievement, sports and treatment of their ill children indicates that this might be the case (Maccoby and Jacklin 1987; Hill and Zimmerman 1995; Eccles et al. 2000; Mondschein, Adolph and Tamis-LeMonda 2000). Often, parents do not even realize they have and convey gender-stereotyped expectations (Eccles et al. 2000).

Second, mothers may simply be preparing their sons for a different set of dangers and opportunities than their daughters. Turning first to dangers, boys are more likely than girls to venture

independently into unsafe situations, particularly black boys or boys living in low-resource neighborhoods. In interviews with families in economically depressed, high-crime areas of Philadelphia, Anderson (1999) finds that parents understand their boys are more likely than their girls to encounter the volatility and danger of their neighborhoods head-on. Harsh or more restrictive parenting may either toughen their boys up to deal with the volatility or, to the extent possible, serve as a mechanism for limiting the degree to which they will encounter that volatility. Among whites, disparities in discipline practices may reflect expectations for rougher peer group interactions for boys than girls rather than actual danger.

Alternatively, parents may survey the opportunities available to their children and conclude their sons and daughters are heading towards somewhat different futures. As Hill (2001) discusses, black parents may observe that the opportunity structure favors daughters over sons. Consequently, they may feel a need to toughen up their boys to deal with constrained opportunities and racism to a greater extent than their girls. Among whites, the opportunities available to men surpass all other groups; parents may discipline boys to a greater degree to prepare them for future responsibilities.

Understanding Different Effects by Gender: Neighborhood, Family and Parenting

The second question under investigation here also addressed whether child sex moderates important influences on aggression in a manner that puts boys on a path towards higher levels of behavior problems. Modest support was found for this hypothesis. In the full sample of children, significant interactions were found with mothers' victimization by violence, having a partner move into the household and all three parenting practices. Beginning with maternal neighborhood experiences, mothers' victimization may lead to modest gender gaps in initial aggression by inducing less aggressive behaviors in girls but having no influence on boys. This gender difference is also significant among blacks. In some sense, girls' aggression improves in response to victimization, though the positive nature of this shift is unclear. Perhaps mothers' trauma causes young girls to change behaviors to maintain calm in the household for their mothers while boys, owing to a biological tendency towards higher levels of

aggression, simply cannot do the same. Alternatively, girls may be more likely to withdraw than boys in response to violence experienced by the mother (Osofsky 1995).

Moving to instability in the family structure, we see that having a biological or social father move into the household between the child's birth and age 3 increases initial aggression in boys but not girls in the full sample of children as well as among blacks. Why might boys be more negatively responsive to this shift in household structure? First, this upheaval may simply encourage growth in boys' underlying predisposition towards aggressions, given that boys tend to be more sensitive to this type of stress (Sigle-Rushton and McLanahan 2004). Second, having another male move into the household changes the mother-child dynamics. For example, Thomas, McLanahan and Curtin (1992) report that single mothers spend more time with their children than married or cohabiting mothers. Perhaps a mother's boys—her partner (biological or social father) and her son—may be competitors for her attention, from either her perspective or the child's (Crosbie-Burnett and Ahrons 1985; Hetherington and Jodl 1994) to a greater extent than daughters. However, while Hetherington (1993) finds that a satisfying marital relationship between a biological mother and stepfather elicit negative behavioral responses from both sons and daughters, those responses tend to subside with time for boys but not girls.

Alternatively, the introduction of a male role model into a child's household may lead to an increase in aggressive behaviors on par with what might be observed in households that stably contain a male partner. A meta-analysis of research on gender differences between children in single-mother and married families shows that boys in single-mother homes tend to be somewhat less gender stereotyped than boys who grow up with a father, except in the case of aggression among older boys (Stevenson and Black 1988). With the entry of a biological father or new partner into the home, young boys may simply have a more aggressive set of behaviors to emulate and, given young children's limited capacity to control their behaviors (e.g. Coie and Dodge 1998), take the aggression too far. In the sample studied here, gaps in the effect for boys and girls lessen with age. Aggression-inducing stress may dissipate as biological or social fathers spend more time in the home (e.g. Hetherington and Jodl 1994) and become

involved in young boys' lives in a manner that improves their well being (e.g. Hetherington 1993; Bzostek 2007).

In the full sample of children, all three parenting practices interact with child gender in producing aggression. For physical discipline, the interaction works against the gender gap described above: girls' aggression grows to a much greater extent than boys' aggression. This result is consistent in all subgroups, though it is only fully significant and robust to explorations of reverse causality among whites. Perhaps because girls are typically socialized towards less aggressive behaviors, this arguably aggressive form of punishment elicits a particularly strong response from girls. Results indicate that psychological aggression harms initial aggression more for boys in the full sample, but that difference is not robust to controls for child temperament. The extra increase in aggression for boys resulting from nonviolent discipline in the full sample and among whites, on the other hand, is robust to various specifications and tends not to diminish over time. This is a somewhat surprising finding given that nonviolent discipline techniques are considered beneficial to child well being. Perhaps a predisposition towards aggression in boys, combined with a tendency towards higher aggression at young ages for all children, results in even adaptive discipline techniques associating with higher aggression until they are well past early childhood.

Why Do Black Boys Exhibit Higher Aggression?

The present analyses also provide some insight into why black boys stand out relative to black girls and whites in a variety of negative behavioral outcomes. First, while black boys and girls are ultimately influenced in a similar fashion by instability in family structure between birth and age 3, blacks are more likely than whites to have repeated exposure to these factors. Partnership instability is more common among blacks and unmarried mothers than among whites and married mothers (Ellwood and Jencks 2004). Though the effect of the "move in" prior to age 3 subsides for black boys with age, they are likely to experience similar instability again between age 3 and age 5 or beyond.

Second, preliminary work on the sample used in this investigation indicates that mothers of black boys continue to employ higher levels of psychological aggression than mothers of black girls or whites

by age 5 (author's tabulations). The harmful effect of psychological aggression at age 3 declines only slightly with time, and repeated exposure may re-boost black boys' behavior problems over girls or whites.

Third, the fact that black boys are more aggressive than their peers in early childhood may be sufficient for ensuring they remain so and perhaps move further ahead with age. Initially minor gaps in behavior problems by race and sex may encourage the growth of a major gap with time. Moffitt et al. (2001) show that with the exception of age 15, sex differences in antisocial behavior increase from age 5 to age 21 among youth in the Dunedin Longitudinal Study. Perhaps feedback between children and contexts—admonishment from teachers, fights with parents, encouragement from friends—might exacerbate disparities in aggression over time in a manner similar to antisocial behavior.

Limitations

This study suffers from a few limitations. First, reports of child aggression were only available at two points in time, requiring assumptions about the structure of variation in the data. However, robustness checks indicated these assumptions had little impact on key results. Second, aggression tends to peak at age 3 across all children. While the trajectory in aggression from age 3 to 5 provides important insights into understanding child behavior problems, an alternative picture may emerge from analyses investigating shifts in aggression or related behavior problems among somewhat older children. Future investigations should juxtapose explorations of aggression in multiple phases of childhood. Third, selection may account for some of the association of both neighborhood characteristics and family structure with child aggression. Unstable or single-mother families or families that live in resource-poor, violent areas may have children with high levels of aggression regardless of the actual family or neighborhood context. Further, one cannot rule out that the bi-directional association between parenting and child behavior was not fully addressed by the procedures employed here. Though the longitudinal nature of this investigation and the rich set of controls minimize these possibilities, they remain an important consideration.

Policy Implications

Finally, a few policy implications emerge from the present research. The findings of this investigation point to two factors in particular that may push black boys onto this negative path at an early age: household instability and psychologically aggressive parenting. It is as of yet unclear whether federal marriage promotion initiatives will increase stability in or the health of partnerships, both of which may have implications for parenting practices. However, programs such as Head Start and high quality early childhood interventions that address both parent and child factors can assist families in introducing stable routines into children's lives and promote less harsh parenting techniques. Given the array of challenges faced by many families of young black children—concentrated poverty, segregation, single parenthood and discrimination, to name a few—high quality early childhood interventions shown to reduce delinquency and criminal behavior as well as improve academic and labor market outcomes (Yoshikawa 1995; Carneiro and Heckman 2004) may be the best bet for shifting outcomes among black males.

Policy can also address neighborhood factors that prove harmful or helpful to child behavior problems regardless of race or child sex. While shifting the overall level of deprivation in a neighborhood or shifting individual families to less deprived neighborhoods may prove challenging (for example, only 47 percent of families in the MTO project receiving vouchers and assistance for relocation to low poverty neighborhoods actually moved to low poverty neighborhoods; Kling et al. 2007), more targeted interventions can address maternal neighborhood experiences. Expanded policing, for example, might address the degree to which mothers witness violence near their homes. Community resources such as activity centers, watch programs and fairs can enhance mothers' sense of cohesion. Both a decrease in disorder and an elevation of cohesion can have a direct effect on children or indirectly improve outcomes by enhancing a mother's capacity to effectively parent and monitor her child (e.g. Osofsky 1999). For black boys in particular, such interventions may have the added benefit of reducing the neighborhood volatility that will threaten their well being as they independently navigate their neighborhoods as adolescents.

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Table 1. Descriptive statistics on child aggression and key predictors in the full sample of children by child sex and results of t-tests comparing subgroups of children. Standard deviations are given in parentheses.

	All	Boys	Girls	Boy-Girl Difference? ¹
Aggression				
Year 3	.62 (.36)	.65 (.37)	.60 (.35)	**
Sample Size	3071	1609	1462	
Year 5	.45 (.31)	.47 (.32)	.42 (.30)	**
Average change over time	-.18 (.32)	-.18 (.33)	-.17 (.31)	nd
Sample Size	2282	1188	1094	
Neighborhood Deprivation				
Factor	.00 (1.00)	.02 (1.03)	-.02 (.99)	nd
Proportion	.60 (.49)	.61 (.49)	.58 (.49)	nd
Maternal Neighborhood Experiences				
Social cohesion	3.48 (.98)	3.46 (1.00)	3.50 (.96)	nd
Witnessed violence	12.32 (41.19)	12.43 (38.49)	12.20 (43.98)	nd
Victim of violence	1.52 (12.82)	1.44 (11.14)	1.61 (14.45)	nd
Family Stability (proportions)				
Live stably with biological parents	.43 (.50)	.42 (.49)	.45 (.50)	nd
Live stably without biological or social father	.18 (.38)	.18 (.38)	.17 (.38)	nd
Bio or social father moves in	.15 (.35)	.15 (.36)	.14 (.34)	nd
Bio or social father move out	.13 (.33)	.13 (.33)	.13 (.33)	nd
Multiple moves	.12 (.32)	.12 (.32)	.12 (.32)	nd
Parenting				
Physical discipline				
Continuous	15.58 (18.34)	17.29 (19.46)	13.70 (16.82)	**
Proportion	.83 (.38)	.84 (.37)	.81 (.39)	*
Psychological aggression	24.38 (20.04)	25.80 (20.52)	22.81 (19.38)	**
Nonviolent discipline	55.68 (28.20)	57.11 (28.25)	54.12 (28.07)	**
Sample Size	3071	1609	1462	

1. Comparisons of average aggression at year 3 and year 5 employ one-tailed t-tests, because boys are expected to be more aggressive than girls. All other comparisons employ two-tailed tests.

** p<0.01; * p<0.05; ^ p<.10; nd=no significant difference

Table 2. Descriptive statistics on child aggression and key predictors among black and white children by race and child sex and results of t-tests comparing subgroups of children. Standard deviations are given in parentheses.

	Blacks			Whites			Black-White Differ?
	Boys	Girls	Boy-Girl Differ?	Boys	Girls	Boy-Girl Differ?	
Aggression							
Year 3	.66 (.38)	.60 (.35)	**	.62 (.35)	.59 (.34)	^	nd
Sample Size	782	690		358	326		
Year 5	.49 (.32)	.43 (.31)	**	.45 (.32)	.41 (.28)	*	^
Average change over time	-.18 (.33)	-.16 (.32)	nd	-.17 (.30)	-.18 (.26)	nd	nd
Sample Size	600	537		270	243		
Neighborhood Deprivation							
Factor	.49 (1.01)	.43 (.94)	nd	-.83 (.67)	-.88 (.61)	nd	**
Proportion	.80 (.40)	.78 (.41)	nd	.20 (.40)	.18 (.38)	nd	**
Maternal Neighborhood Experiences							
Social cohesion	3.23 (1.02)	3.31 (.95)	nd	3.88 (.92)	3.99 (.91)	nd	**
Witnessed violence	18.27 (46.60)	19.80 (58.43)	nd	3.54 (10.08)	4.25 (13.57)	nd	**
Victim of violence	1.65 (11.07)	2.59 (20.37)	nd	.46 (2.80)	.77 (5.23)	nd	*
Family Stability (proportions)							
Live stably with biological parents	.24 (.43)	.27 (.45)	nd	.65 (.48)	.66 (.47)	nd	**
Live stably without biological or social father	.26 (.44)	.24 (.43)	nd	.09 (.28)	.08 (.28)	nd	**
Bio or social father moves in	.19 (.39)	.17 (.39)	nd	.08 (.27)	.07 (.26)	nd	**
Bio or social father move out	.14 (.35)	.15 (.36)	nd	.11 (.31)	.10 (.29)	nd	**
Multiple moves	.16 (.37)	.16 (.36)	nd	.08 (.27)	.09 (.29)	nd	**
Parenting							
Physical discipline							
Continuous	20.59 (21.03)	17.49 (19.03)	**	16.14 (18.02)	12.67 (15.30)	**	**
Proportion	.88 (.32)	.87 (.34)	nd	.83 (.38)	.80 (.40)	nd	**
Psychological aggression	28.56 (20.78)	26.31 (20.29)	*	25.24 (20.04)	22.05 (19.62)	*	**
Nonviolent discipline	55.12 (28.50)	52.77 (28.10)	nd	67.94 (24.43)	66.05 (24.69)	nd	**
Sample Size	782	690		358	326		

1. Comparisons of average aggression at year 3 and year 5 employ one-tailed t-tests, because boys are expected to be more aggressive than girls. All other comparisons employ two-tailed tests.

** p<0.01; * p<0.05; ^ p<.10; nd=no significant difference

Table 3. Descriptive statistics on control variables in the full sample of children by child sex and results of two-tailed t-tests comparing subgroups of children. Unless otherwise noted, numbers are proportions. Standard deviations are given in parentheses.

	Full Sample	Boys	Girls	Boy-Girl Difference?
Child Characteristics				
Low birth weight	.10 (.30)	.10 (.30)	.11 (.31)	nd
Twin	.01 (.12)	.01 (.12)	.02 (.12)	nd
First born child	.39 (.49)	.40 (.49)	.38 (.48)	nd
Maternal and Household Characteristics				
Race/Ethnicity				
White	.22 (.42)	.22 (.42)	.22 (.42)	nd
Black	.48 (.50)	.49 (.50)	.47 (.50)	nd
Mexican	.15 (.36)	.14 (.35)	.16 (.37)	^
Non-Mexican Hispanic	.11 (.31)	.11 (.32)	.11 (.31)	nd
Other	.04 (.19)	.04 (.19)	.03 (.19)	nd
Education (high school or more)	.67 (.47)	.67 (.47)	.67 (.47)	nd
Age at child's birth (continuous)	25.18 (6.08)	25.07 (6.10)	25.30 (6.06)	nd
Depression (probable case)	.15 (.36)	.15 (.36)	.15 (.35)	nd
Born out of US	.14 (.35)	.14 (.35)	.14 (.35)	nd
Household income				
<\$15,000	.34 (.47)	.35 (.48)	.33 (.47)	nd
\$15,000-\$40,000	.33 (.47)	.34 (.47)	.32 (.47)	nd
>\$40,000	.26 (.44)	.25 (.43)	.28 (.45)	nd
Missing	.06 (.25)	.06 (.24)	.07 (.25)	nd
Sample Size	3071	1609	1462	

** p<0.01; * p<0.05; ^ p<.10; nd=no significant difference

Table 4. Descriptive statistics on control variables among black and white children by race and child sex and results of two-tailed t-tests comparing subgroups of children. Unless otherwise noted, numbers are proportions. Standard deviations are given in parentheses.

	Black			White			Black-White Difference?
	Boys	Girls	Boy-Girl Difference?	Boys	Girls	Boy-Girl Difference?	
Child Characteristics							
Low birth weight	.13 (.33)	.13 (.33)	nd	.09 (.39)	.10 (.31)	nd	*
Twin	.01 (.12)	.01 (.12)	nd	.02 (.15)	.02 (.13)	nd	nd
First born child	.34 (.47)	.35 (.48)	nd	.47 (.50)	.43 (.50)	nd	**
Maternal and Household Characteristics							
Education (high school or more)	.68 (.46)	.66 (.47)	nd	.82 (.38)	.81 (.39)	nd	**
Age at child's birth (continuous)	23.91 (.5.53)	24.61 (5.77)*	nd	27.50 (6.56)	27.18 (6.45)	nd	nd
Depression (probable case)	.18 (.38)	.16 (.37)	nd	.15 (.35)	.14 (.35)	nd	nd
Born out of US	.03 (.18)	.02 (.16)	nd	.03 (.18)	.03 (.18)	nd	nd
Household income	.43 (.50)	.42 (.49)	nd	.14 (.35)	.17 (.38)	nd	**
<\$15,000	.34 (.47)	.31 (.46)	nd	.30 (.46)	.28 (.45)	nd	nd
\$15,000-\$40,000	.15 (.36)	.19 (.39)^	nd	.51 (.50)	.51 (.50)	nd	**
>\$40,000	.07 (.26)	.07 (.26)	nd	.05 (.22)	.04 (.19)	nd	**
Missing	782	690		358	326		
Sample Size	782	690		358	326		

** p<0.01; * p<0.05; ^ p<.10; nd=no significant difference

Table 5. Results from 3-level hierarchical linear models exploring main effects of neighborhood characteristics, family structure and parenting on initial level of child aggression (age 3.2) and annual change in child aggression among all children. Standard errors shown in parentheses.

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
	Neighborhood (tract)	Neighborhood (experiences)	Neighborhood (all)	Family Structure	Parenting	Neighborhood +Family	All Main Effects
Effects on Average Initial Level of Aggression							
Neighborhood Deprivation	.058** (.016)		.037* (.016)			.036* (.016)	.033* (.014)
Maternal Neighborhood Experiences							
Social cohesion		-.056* (.007)	-.054** (.007)			-.053** (.007)	-.040** (.007)
Witnessed violence		.0009** (.0002)	.0008** (.0002)			.0008** (.0002)	.0007** (.0002)
Victim of violence		-.0005 (.0006)	-.0005 (.0006)			-.0005 (.0006)	-.0007 (.0005)
Family Structure (reference: live stably with biological parents from birth to age 3)							
Live stably without biological or social father				.068** (.020)		.057** (.020)	.056** (.019)
Bio or social father moves in				.031 (.021)		.027 (.021)	.033^ (.019)
Bio or social father move out				.004 (.022)		.003 (.021)	-.010 (.020)
Multiple moves				.036 (.022)		.034 (.022)	.028 (.021)
Parenting							
Physical discipline (any)					.106** (.017)		.106** (.017)
Psychological aggression					.0051** (.0004)		.0048** (.0004)
Nonviolent discipline					.0013** (.0002)		.0014** (.0002)
Male	.045** (.013)	.045** (.013)	.044** (.013)	.046** (.013)	.026* (.012)	.044** (.013)	.025* (.012)
Intercept	.738** (.039)	.912** (.044)	.894** (.045)	.742** (.041)	.426** (.041)	.878** (.047)	.503** (.048)
Control Variables	included	included	included	included	included	included	included

Table continues on next page.

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	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
Effects on Average Annual Change in Aggression							
Neighborhood Deprivation	-.003 (.007)		-.000 (.007)		.000 (.007)		.002 (.007)
Maternal Neighborhood Experiences							
Social cohesion		.007* (.003)	.007* (.003)		.007* (.003)		.005 (.003)
Witnessed violence		-.0001^ (.0001)	-.0001^ (.0001)		-.0001^ (.0001)		-.0001 (.0001)
Victim of violence		-.0001 (.0002)	-.0001 (.0003)		.0001 (.0003)		-.0000 (.0002)
Family Structure (reference: live stably with biological parents from birth to age 3)							
Live stably without biological or social father				-.010 (.009)		-.008 (.009)	-.008 (.009)
Bio or social father moves in				.001 (.010)		.001 (.010)	-.001 (.010)
Bio or social father move out				.003 (.010)		.003 (.010)	.006 (.010)
Multiple moves				.014 (.010)		.014 (.010)	.016 (.010)
Parenting							
Physical discipline (any)				-.010 (.008)			-.010 (.008)
Psychological aggression				-.0013** (.0002)			-.0013** (.0002)
Nonviolent discipline				-.0003* (.0001)			-.0003* (.0001)
Male	-.002 (.006)	-.002 (.005)	-.002 (.005)	-.002 (.006)	.003 (.006)	-.001 (.006)	.003 (.006)
Intercept	-.073** (.018)	-.094** (.021)	-.094** (.021)	-.079** (.019)	-.008 (.020)	-.098** (.022)	-.027 (.024)
Control Variables	included	included	included	included	included	included	included
Total Individuals	3071	3071	3071	3071	3071	3071	3071
Total Neighborhoods/Tracts	2150	2150	2150	2150	2150	2150	2150
Deviance	24875.58	24781.97	24774.20	24872.64	24395.40	24757.60	24283.52

** p<0.01; * p<0.05; ^ p<.10

Table 6. Results of 3-level hierarchal linear models exploring main effects of neighborhood characteristics, family structure and parenting on child aggression among blacks and whites and differences in main effects between blacks and whites. Standard errors in parentheses.

	Black	White	Black-White Difference ^{1?}
Neighborhood Characteristics			
Neighborhood Deprivation			
Initial Level	.034 (.022)	.029 (.030)	nd
Annual Change	.008 (.011)	-.003 (.015)	nd
Maternal Neighborhood Experiences			
Social Cohesion			
Initial Level	-.025 (.009)**	-.083 (.014)**	**
Annual Change	-.002 (.004)	.011 (.007)^	nd
Witness Violence			
Initial Level	.0009 (.0201)**	.0016 (.0010)^	nd
Annual Change	-.0002 (.0001)*	-.0003 (.0005)	nd
Victim of Violence			
Initial Level	-.0019 (.0006)**	.0002 (.0027)	nd
Annual Change	.0005 (.0003)^	.0003 (.0012)	nd
Family Structure			
Reference: Live Stably w/ Mom and Dad			
Live Stably w/ Single Mom			
Initial Level	.048 (.026)^	-.033 (.043)	nd
Annual Change	-.010 (.013)	.012 (.021)	nd
Partner Moves In			
Initial Level	.016 (.028)	.001 (.044)	nd
Annual Change	.001 (.014)	.035 (.022)	nd
Partner Moves Out			
Initial Level	-.033 (.030)	.003 (.040)	nd
Annual Change	.012 (.014)	.007 (.020)	nd
Multiple Moves			
Initial Level	.018 (.029)	-.042 (.043)	nd
Annual Change	.018 (.014)	.044 (.021)*	nd
Parenting Practices			
Physical Discipline (any)			
Initial Level	.101 (.028)**	.073 (.030)*	nd
Annual Change	.003 (.014)	.000 (.015)	nd
Psychological Aggression			
Initial Level	.0040 (.0005)**	.0051 (.0007)**	nd
Annual Change	-.0009 (.0003)**	-.0011 (.0003)**	nd
Nonviolent Discipline			
Initial Level	.0011 (.0004)**	.0027 (.0005)**	**
Annual Change	-.0002 (.0002)	-.0005 (.0002)*	nd
Child Gender - Male			
Initial Level	.041 (.018)*	.014 (.022)	nd
Annual Change	-.004 (.008)	.011 (.011)	nd
Control Variables		(included)	(included)
Total Individuals		1472	684
Total Neighborhoods/Tracts		1086	611
Deviance		11969.49	5138.49

1. Significant differences in main effects by race are tested with the following:

$$z=(b_1-b_2)/(se_1^2 + se_2^2)^{1/2}$$

** p<0.01; * p<0.05; ^ p<.10; nd=no significant difference

Table 7. Results of 3-level hierarchical linear models exploring interaction effects between child sex and neighborhood characteristics, family structure and parenting practices on the initial level of and average annual change in aggression among all children. Only significant interactions are shown. Standard errors shown in parentheses.

All Children	
Maternal Neighborhood Experiences	
Victim of Violence	
Initial Level	-.0019 (.0007)**
X Male	.0028 (.0009)**
Annual Change	.0003 (.0003)
X Male	-.0008 (.0005)^
Family Structure	
Move In	
Initial Level	-.012 (.026)
X Male	.082 (.033)*
Annual Change	.015 (.013)
X Male	-.029 (.016)^
Parenting	
Physical Discipline (any)	
Initial Level	.134 (.021)**
X Male	-.058 (.028)^
Annual Change	-.011 (.008)
X Male	--
Psychological Aggression	
Initial Level	.0040 (.0005)**
X Male	.0013 (.0007)*
Annual Change	-.0009 (.0002)**
X Male	-.0007 (.0003)*
Nonviolent Discipline	
Initial Level	.0010 (.0003)**
X Male	.0007 (.0004)^
Annual Change	-.0003 (.0001)*
X Male	--
Child Gender - Male	
Initial Level	-.064 (.036)^
Annual Change	.025 (.010)*
Key Predictors	(included)
Control Variables	(included)
Total Individuals	3071
Total Neighborhoods/Tracts	2150
Deviance	24253.30
** p<0.01; * p<0.05; ^ p<.10	

Table 8. Results of 3-level hierarchical linear models exploring interaction effects between child sex and neighborhood characteristics, family structure and parenting practices on the initial level of and average annual change in aggression among black and white children. Only interactions significant among either blacks or whites are included in each model. Standard errors shown in parentheses.

	Blacks	Whites	B-W Difference? ¹
Maternal Neighborhood Experiences			
Victim of Violence			
Initial Level	-.0025 (.0007)**	-.0018 (.0031)	--
X Male	.0021 (.0010)*	.0058 (.0054)	nd
Annual Change	.0005 (.0003)^	.0007 (.0013)	--
X Male	--	--	
Family Structure			
Move In			
Initial Level	-.056 (.038)	.022 (.064)	--
X Male	.132 (.045)**	-.020 (.083)	nd
Annual Change	.031 (.018)^	.040 (.034)	--
X Male	-.052 (.021)*	-.013 (.043)	nd
Move Out			
Initial Level	-.027 (.037)	-.076 (.054)	--
X Male	-.011 (.042)	.148 (.065)*	*
Annual Change	.012 (.014)	.005 (.020)	--
X Male	--	--	
Parenting			
Physical Discipline (any)			
Initial Level	.114 (.038)**	.140 (.041)**	--
X Male	-.028 (.054)	-.132 (.056)*	*
Annual Change	.025 (.019)	.001 (.020)	--
X Male	-.048 (.026)^	-.001 (.027)	nd
Nonviolent Discipline			
Initial Level	.0010 (.0005)*	.0017 (.0007)*	--
X Male	.0002 (.0006)	.0018 (.0009)*	nd
Annual Change	-.0004 (.0002)^	-.0009 (.0003)**	--
X Male	.0004 (.0003)	.0009 (.0005)^	nd
Child Gender - Male			
Initial Level	.029 (.057)	-.011(.074)	--
Annual Change	.027 (.028)	-.045 (.036)	--
Key Predictor Main Effects	(included)	(included)	
Control Variables	(included)	(included)	
Total Individuals	1472	684	
Total Neighborhoods/Tracts	1086	611	
Deviance	11946.68	5065.89	
1. Significant differences in interaction effects by race are tested with the following: $z=(b_1-b_2)/(se_1^2 + se_2^2)^{1/2}$			
** p<0.01; * p<0.05; ^ p<.10; nd=no significant difference			

Figure 1. Social Influence on Early Child Behavior Problems

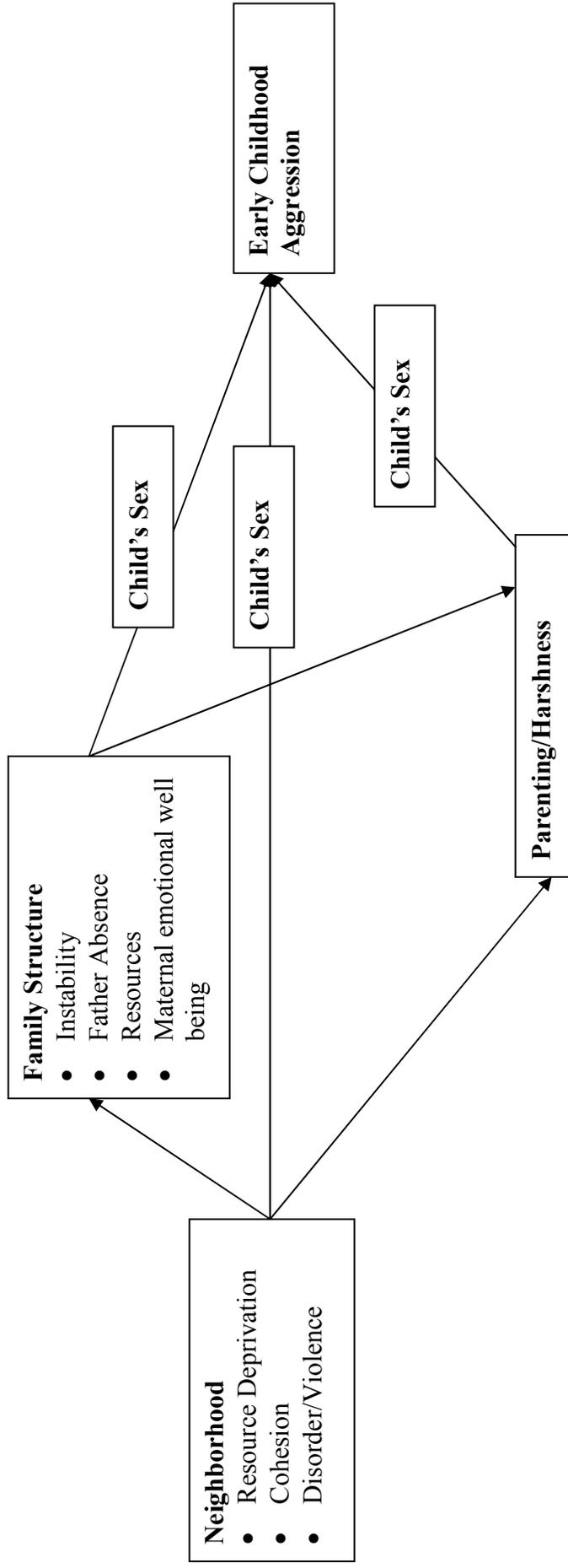


Figure 2. Pattern of effects of neighborhood, family structure and parenting variables on boys and girls from age 3.2 years to 5.4 years.

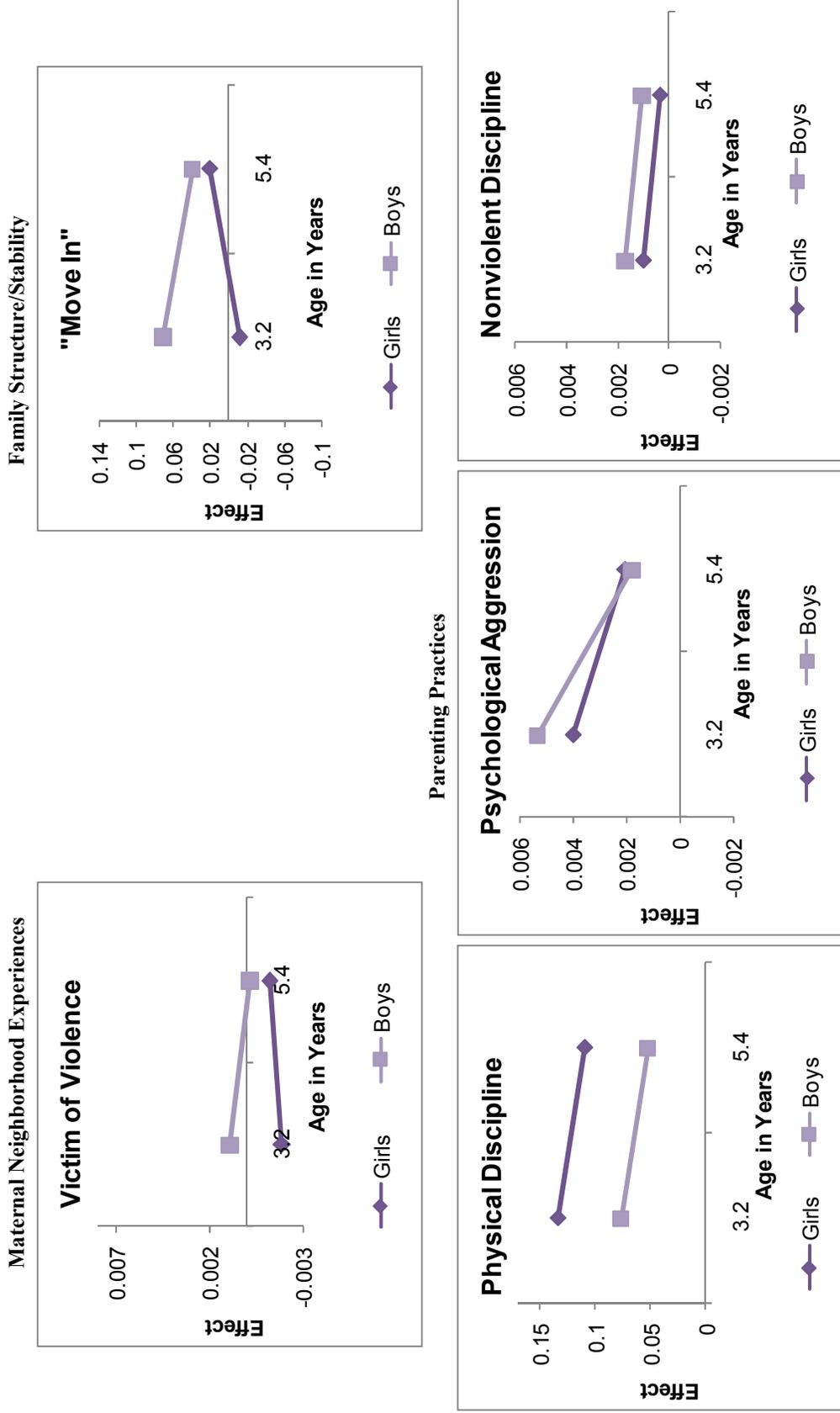


Figure 3. Pattern of effects of neighborhood, family structure and parenting variables on black and white boys and girls from age 3.2 years to 5.4 years.

