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A LONGITUDINAL EXAMINATION OF THE BEHAVIORAL CHARACTERISTICS  
ASSOCIATED WITH THE EMERGENCE OF EARLY ADOLESCENT CONDUCT  
PROBLEMS IN GIRLS AND BOYS

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by

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## Abstract

The purpose of this study was to explore gender similarities and differences in the longitudinal relations between kindergarten behavioral characteristics, 4<sup>th</sup> grade adaptation ratings, and 7<sup>th</sup> grade self-reported antisocial activity, substance use, and sexual activity. In the present study, girls and boys followed the same model in the emergence of antisocial activity. Kindergarten aggressive and dysregulated behaviors (hyperactivity, inattention, opposition) uniquely predicted antisocial activity. Fourth grade adaptation (peer and academic) ratings contributed with aggressive and dysregulated behavioral characteristics to predict substance use and sexual activity. Although boys were more likely than girls to exhibit overt aggression at school entry, girls who were aggressive had outcomes that were similar to aggressive boys. Dysregulated behavior problems that were part of the disruptive behavior spectrum (e.g., hyperactivity, oppositionality, and inattention) contributed to antisocial and related risky outcomes in similar ways for girls and boys. Gender differences in the extent to which antisocial adolescents had grade-school histories of aggressive behavior appeared to reflect base rate differences in the prevalence of overt aggression at school entry, rather than gender differences in the predictive course of aggression or other dysregulated behaviors during middle childhood. Results highlight the importance of assessing similar models of behavioral characteristics and adaptation markers in the prediction of

preadolescent conduct problems for both girls and boys. Future research is needed to delineate the specific processes by which early aggression, associated dysregulated behaviors, and grade-school peer and academic problems are linked to later conduct problems.

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## Chapter 1: Introduction

Adolescent girls with conduct problems are more likely to become adolescent mothers, to depend on the welfare system, to have higher levels of psychiatric symptomatology, and to have children with early signs of psychosocial difficulties than are their normative peers (Bardone, Moffitt, Caspi, Dickson, & Silva, 1996; Chesney-Lind & Brown, 1999; Robins, 1986, Woodward & Fergusson, 1999; Zoccolillo, 1993). Although girls have a lower prevalence rate of conduct problems than boys, diagnosed conduct disorder is still the second most common psychiatric disorder in girls, and by adolescence, the gender differences in the rates of both conduct problems and diagnosis of conduct disorder diminish greatly (APA, 1994; Zoccolillo, 1993). Given the established negative outcomes for girls with adolescent conduct problems, researchers have recently begun to focus particular attention on assessing early determinants as targets for prevention and intervention efforts with this at-risk population (Chesney-Lind & Brown, 1999; Silverthorn & Frick, 1999; Wangby, Bergman, & Magnusson, 1999; Weiler, 1999; Woodward & Fergusson, 1999).

To date, most of the developmental research on conduct problems has relied on longitudinal samples of boys (Robins, 1986; Silverthorn & Frick, 1999; Zoccolillo, 1993), understood within the context that boys commit more overall criminal offenses than girls (4:1; Girls Incorporated, 1996), and that boys evidence significantly higher rates of behavioral disturbances during the elementary school years (Keenan & Shaw, 1997). Among boys, a well-researched early-starting model suggests that boys who show

high rates of aggressive and dysregulated behaviors at school entry are at elevated risk for the development of chronic antisocial behaviors in adolescence (Patterson, DeBaryshe, & Ramsey, 1989). Girls show significantly lower rates of aggressive behavior than boys at elementary school entry, leading investigators to suggest that these behaviors may not function well to identify most at risk girls (Robins, 1986; Zahn-Waxler, 1993; Zoccolillo, 1993). As an alternative, some theorists have suggested a “delayed-onset” pathway. In this model, vulnerabilities are evident from early childhood, but the emergence of aggressive and antisocial behaviors does not occur until early adolescence (see Silverthorn & Frick, 1999). It is posited that some of the predisposing factors in a delayed-onset trajectory are quite similar to those for an early-starting model. For example, Silverthorn and Frick (1999) postulate that these girls enter school with a history of negative interactions in the family context, cognitive processing difficulties, as well as low inhibitions, which set the stage for the emergence of antisocial behaviors in adolescence. The term “delayed-onset” refers to the finding that aggressive and other associated dysregulated behaviors appear to emerge later for these girls (during early adolescence) rather than emerging at school entry, as they do for boys.

The purpose of this study is to take a close look at the behavior patterns at school entry that might be linked with emerging trajectories of conduct problems in girls. Empirical research documents that conduct problems in boys are well predicted from early aggressive behaviors – the early onset model. Physical aggression is much less prevalent at school entry for girls compared to boys (Keenan & Shaw, 1997), and hence, may not identify many of the girls who later develop conduct problems. Theorists have

postulated that for girls, the path to later conduct problems might be better explained by a delayed-onset model. Nonaggressive yet dysregulated behaviors including hyperactive behaviors, oppositional behaviors, and inattention may function as behavioral vulnerabilities and warrant close examination as potential risk factors characterizing a delayed-onset for girls. In addition, research specifically testing how the early-starter developmental model might unfold for girls from the point of school entry is significantly lagging behind that for the boys. Though not prevalent, the few girls who show elevated aggression at school entry may be at risk for the development of conduct problems, equal to boys with equivalent aggression scores.

The following chapter will lay the foundation for this study with several sections:

- 1) a description of the early-starting model of antisocial development in boys, including the role of aggression and associated dysregulated behaviors such as oppositionality, hyperactivity, and inattention,
- 2) evidence for gender differences in the developmental course of aggression and dysregulated behaviors,
- 3) evidence for the predictability of conduct problems among girls from early aggressive and dysregulated behaviors, and
- 4) examination of the potential additional predictive power associated with adaptation difficulties in areas of academic performance and peer relations.

## Chapter 2: Developmental Patterns Linked with Emerging Trajectories of Conduct Problems.

### The Early-Starting Model of Conduct Problem Development in Boys

Empirical research regarding the development of antisocial behavior in boys supports a model with two potential pathways: an early-starting pathway (negative behaviors are stable from school entry on), and a late-starting pathway (occurrence of antisocial behavior begins during mid-adolescence) (Moffitt, 1993; Patterson, DeBaryshe, & Ramsey, 1989). These different pathways have implications for prognosis and developmental course, as early-starters have a much higher probability than late-starters of showing life-persistent patterns of antisocial behavior. Although this group is small, they make up for about half the arrests and convictions for a given cohort (Dishion, French, & Patterson, 1995; Loeber, et al., 1993; Moffitt, 1993).

Spectrum of Behaviors Associated with the Early-Starting Profile. The hallmark “red flag” for the early-starting model is high rates of aggressive behaviors exhibited at school entry. Early aggressive behaviors are particularly predictive of later antisocial behavior when they are associated with a spectrum of dysregulated behaviors including hyperactivity (Hinshaw, 1992b) and inattention (White et. al., 1994), and when they show cross-situational patterns (home and school elevations) (Loeber & Dishion, 1983). That is, the pattern or spectrum of problems a child shows at school entry is predictive, such that boys with an aggressive-spectrum (multi-faceted problem profiles) are at higher risk

than boys with aggression alone to develop serious and chronic patterns of antisocial behavior (Loeber & Schmalting, 1984; Lynam, 1996). For example, Loeber and colleagues found that boys who exhibited aggressive-spectrum profiles (e.g., aggression with concurrent defiance, oppositionality, poor impulse control) during the early grade school years were far more likely than boys who exhibited aggression alone to commit both violent and nonviolent crimes in adolescence (Loeber, et al. 1993; Tatem-Kelley, Loeber, Keenan, & DeLamatre, 1997). Similarly, Pope and Bierman (1999) found that a spectrum of dysregulated and aggressive behaviors (inattention-immaturity plus aggressiveness) in grade school was more likely than aggression alone to predict antisocial activity in adolescence. Further, research has demonstrated that children who demonstrate chronic patterns of antisocial behavior, when compared to boys who show transitional or adolescent-limited patterns of antisocial behavior, are more likely to exhibit additional problem reflecting neurological processing deficits including learning disabilities, executive control deficits (hyperactivity and other dysregulated behavior), and inattention (Moffitt, 1990; Moffitt, 1993; White et al., 1994). Thus, aggressive behavior at school entry appears particularly predictive of chronic adjustment problems and later antisocial activity when it is accompanied by an associated spectrum of dysregulated behaviors including hyperactivity, inattention, and opposition.

Developmental Antecedents (Coercive Patterns). Developmental theorists have suggested that the high-risk early-starter profile at school entry (e.g., multi-problem aggressive-spectrum behavior, home-school difficulties) is typically the result of an earlier developmental history characterized by parent-child conflict, overly harsh and punitive parental responding, the escalation of child defiance, and the deterioration of parent-child relationships. In this developmental model, researchers have focused on the interaction between child temperamental characteristics, parental responses, and the emergence of early coercive parent-child interaction cycles which serve as the early “training ground” for aggressive child responding (Patterson, 1982; Patterson & Stouthamer-Loeber, 1984). In their programmatic research, Patterson and colleagues have documented that family interactions associated with child aggressiveness are marked by coercive cycles in which the child engages in negative behaviors in order to attain a goal or to avoid or terminate a parental command, and the parent alternatively gives in or escalates and reacts punitively. Inconsistent limit-setting along with excessive parent negativity increases the likelihood that the child will become more negative. When the parent periodically gives in to the child’s escalating negativity, the child is positively reinforced for their oppositional and aggressive behavior. That is, by learning that he or she can terminate an aversive parental command by oppositional or aggressive behavior, the child learns to behave aggressively to attain desired interpersonal outcomes. Thus, the child is transforming, as well as being transformed by, their environment. A stable system of mutually coercive cycles is built up out of the countless interactions of early childhood. Patterson acknowledges that these coercive interactions happen even in

normal families, but when daily coercive cycles predominate, children learn to rely more exclusively on negative strategies in their interpersonal encounters. Developmental theorists have posited that, in the early phases of coercive parent-child interchanges, child behaviors are characterized by oppositional and disruptive behaviors (Keenan & Shaw, 1994; Zahn-Waxler, Iannotti, Cummings, & Denham, 1990). As coercive exchanges escalate, child aggression may emerge, representing a child's longer-term exposure to increasing levels of coercive cycles and extended "learning" within the developmental path (Lahey, McBurnett, & Loeber 1999; Lahey, Waldman, & McBurnett, 1999). Coercive training in the home may have several consequences for child functioning at school entry. First, the child who is aggressive at home is at risk for generalizing these negative behaviors to interactions with teachers and peers in school -- generating problematic interactions in the school context. In fact, Patterson and colleagues found a strong and significant path coefficient linking problem behaviors at home with problem behaviors at school a year later (Dishion, French, & Patterson, 1994). When predispositions towards negative reactivity are brought to initial peer and teacher relationships at school entry, coercive cycles entrenched from pre-school years with parents may replay themselves with new relationships in school. As aggressive and oppositional behaviors are reinforced at school (by teacher/peer acquiescence or by enabling the child to "escape" from unwanted demands), and as teachers and peers respond with punitive consequences and counter aggression, the likelihood of escalation of coercive interaction and the continuance of aggression is increased.

In addition to aggressive and oppositional behaviors, early-starting children often

show inattentiveness, hyperactivity, and poor social skills in the school setting. To some extent, these problems may reflect individual vulnerabilities for inattentive and hyperactive behaviors (e.g., neuropsychological difficulties) that may have predated, and contributed to, their socialization difficulties. Developmentalists speculate that coercive parent-child relations disrupt the development of emotional and behavioral self-regulating such that many early-starting children are irritable and negativistic (Greenberg & Speltz, 1988; Shaw, Keenan, & Vondra, 1994). In addition, aggressive, oppositional, hyperactive and inattentive behaviors may cause difficulties with peer interactions. As children are excluded from normal peer socialization experiences, they lack the opportunity to practice positive social skills, and aggressive-spectrum immature behaviors may continue to escalate (Rubin, Chen & Hymel, 1993).

Summary of the early-starting model. Thus, the hypothesized effect at school entry of a history of “coercive” training is a problem profile characterized by 1) elevated aggressiveness, 2) oppositional and hyperactive behaviors, and 3) difficulties with cognitive focus and school readiness, reflected in inattention and difficulties completing school tasks. This spectrum of difficulties contributes to peer rejection which fuels alienation from mainstream peers, placing youth at high-risk for the emergence of antisocial behaviors in early adolescence (Dishion, Patterson & Griesler 1994; Loeber, et al, 1993). The early-starting model of the development of antisocial behavior is based almost exclusively on longitudinal research with boys. Although parts of this early-starting model may hold for girls as well as boys, research on the developmental course of individual vulnerabilities suggest that gender differences exist and are particularly

marked at the point of school entry. Developmental research on gender differences in aggressive and associated dysregulated behaviors and their implications for the development of conduct problems among girls are reviewed in the next section.

### Behavioral Characteristics Associated With Conduct Problems in Girls

The following sections of the review will highlight what is known about dimensions of behavioral characteristics that represent vulnerabilities linked to the emergence of early adolescent conduct problems in girls. First, it appears that when girls show elevated rates of aggression, the risk for concurrent and future maladaptation is high (Cairns & Cairns, 1984; Cairns, Cairns, Neckerman, Ferguson, & Garipey 1989; Stattin & Magnusson, 1989). Second, there are unequivocal gender differences in the measurement of physical aggression, but research has demonstrated that these gender differences wax and wane developmentally (Achenbach, 1991; Keenan & Shaw, 1997). Finally, research has suggested that gender differences are greatest for overt, physical forms of aggression and less marked for other related forms of disruptive behaviors including opposition (Crick, 1997; Pulkinnen & Pitkanen, 1993; Webster-Stratton, 1996).

Aggression is stable and predicts risk for girls. Few studies have charted the developmental course of aggression in girls during the elementary school years (Olweus, 1981; Robins, 1986), due to the relatively lower rates of aggressive behaviors among girls compared to boys in elementary school (Keenan & Shaw, 1997). However, when aggressive grade-school girls have been identified and studied, their problems appear similar to, and as stable as, those of aggressive grade-school boys. For example, in a cross-national six site longitudinal study, Broidy and colleagues (2003) found similar stability from age 6 to 12 years for high levels of physical aggression among both boys and girls. McFayden-Ketchum, Bates, Dodge, Pettit (1996) looked at children over four time points in kindergarten through third grade, and found that the stability and escalation of aggression was equal for both girls and boys. Similarly, Cairns, et al. (1989) found that highly aggressive boys and girls didn't differ in stability of teacher and self-reported aggression from 4th to 8th grade. In another study, Lyons, Serbin, and Marchessault (1989) identified aggressive boys and girls in grades four through sixth and found no group by sex interactions, suggesting that similar to aggressive boys, aggressive girls engaged in more physical aggression on the playground than did the comparison girls. When these children were studied at follow-up three years later, Serbin, et al. (1993) found no gender differences in the stability of aggression.

While limited in quantity, the few longitudinal studies to date that have included girls have found strong evidence for early aggression predicting to later conduct problems. For example, Broidy et al (2003) found girls' physical aggression at age 6 to predict to both violent and nonviolent offending at age 15. Cairns et al (1989) found 4<sup>th</sup>

grade ratings of aggression to be the single best predictor of aggression for girls in 10th grade. Stattin and Magnusson (1989) found aggression in girls ages 10 and 13 predictive of age 26 arrests, and similarly, Pulkkinen and Pitkanen (1993) found that teacher ratings of girls' aggression at age 8 predicted to documented arrests and self-report of problem drinking at age 26. These few studies highlight that when aggression is evident in girls, similar to early-starting boys, aggression is stable and is highly predictive of future maladaptation. However, significant gender differences in overt aggression at school entry and the relatively low base rates among girls at this developmental juncture have implications for the applicability of the early-starting model among girls. Only a small subgroup of girls are aggressive at school entry, and focusing on aggressive behaviors alone might fail to identify another group of high-risk girls who may follow a delayed-onset developmental pattern. The pattern of gender differences in aggression at different developmental periods is described next, along with the implications for the study of antisocial development in girls.

Developmental changes in aggression. Although research supports gender differences in levels of aggression during the elementary school years (Achenbach, et al., 1995; Maccoby, 1990), a recent review suggests that gender differences in physical aggression may vary across different developmental periods (Keenan & Shaw, 1997). Observational studies have found no gender differences in aggression at eighteen or twenty-four months, and the stability of girls' and boys' aggression was comparable (Cummings, Iannotti, & Zahn-Waxler, 1989; Keenan & Shaw, 1994; Shaw, Keenan & Vondra, 1994). Similarly, Caplan et al, (1991) observed twelve and twenty-four-month-

olds in same-sex groups and found that at this early age, girl-dominated groups exhibited more interpersonal conflict than all male groups. Girls also used significantly more instrumental force during conflicts than boys, whereas the groups dominated by boys were characterized by significantly more prosocial behaviors. Keenan and Shaw (1997) assessed the literature and found overwhelming evidence suggesting that, until the age of four, rates of problematic behavior were similar for boys and girls. The findings of these research studies suggest limited gender differences in rates of aggression in the preschool years. This is an important point to consider in light of the early-starting model in which the coercive-training of aggression occurs mostly in the preschool years.

It has also been noted in the literature that during adolescence, girls tend to increase in rates of aggression whereas boys do not (Offord, Boyle, & Racine, 1991). That is, rates of aggression generally rise for girls in adolescence (in both normative samples and among high risk girls), either suggesting something unique about the experience of adolescence for girls (Moffitt, Caspi, Belsky, & Silva, 1992), or something unique about the expression of aggression for girls in the elementary school years (Pulkinnen & Pitkanen, 1993). Some developmental theorists have posited that, when aggression is expanded to reflect a broader-spectrum of acting out problems during the school years, gender differences in conduct problems during the elementary school years diminish (Crick, 1997), and that an aggressive-spectrum of behaviors may be more predictive of concurrent and future maladjustment than measures of physical aggression alone (Deater-Deckard, Dodge, Bates, & Pettit, 1998). In this model, there may be continuity between girls' behaviors at school entry and the later emergence of antisocial

behavior in adolescence, however the risk marker at school entry may not only be aggressive behavior per se, but also related forms of oppositional and negativistic behaviors.

Predictability of aggressive-spectrum behaviors. It has been argued that the dimension being measured and type of measurement may influence the appearance of gender differences in aggression. While research suggests significant gender differences in overt and physical forms of aggression, studies of oppositional and negativistic forms of behavior have found close to similar rates for boys and girls (Webster-Stratton, 1996; Woodward & Fergusson, 1999). For example, Webster-Stratton (1996) studied the early-onset of oppositional defiant disorder with children ages 4-7. In this study, observations revealed no gender differences in levels of total externalizing behaviors (yelling, swearing, arguing); moreover, girls were just as noncompliant to parental requests as boys. Researchers have argued that, rather than physical aggression, negativistic forms of acting-out may more often characterize the expression of hostile and aggressive feelings for girls. Pulkkinen & Pitkanen (1993) factor analyzed types of aggressive behavior (including verbal, physical, and indirect) to identify profiles of problematic behaviors, and found non-physical forms of acting-out (e.g. quarrels, sulking, making faces) formed a cluster distinct from physically aggressive behaviors (e.g., teases, hurts others) in girls, but not boys. When girls from these two clusters were followed longitudinally, rates of documented arrests did not differ. Thus, in this study, earlier nonaggressive oppositional behaviors in girls worked as well as physical aggression to predict arrest rates in adulthood, providing some evidence that oppositional behaviors

(distinct from physical aggression) may mark early risk of future antisocial behavior.

Interestingly, several studies have found that, as the elementary school years progress, gender differences in use of non-physical aggression tend to favor increases for girls and decreases for boys (Archer et. al., 1981, 1988; Cairns, et. al., 1989; Lagerspetz, Bjorkquist, and Peitonen, 1988).

Results of some studies suggest that when an aggressive-spectrum of behaviors is assessed, prediction of later antisocial activity may be potentiated (Deater-Deckard, et al, 1998; Woodward & Fergusson, 1999). Woodward and Fergusson (1999) longitudinally examined 491 girls from the ages of 8 to 18 years. They measured conduct problems as a broad range of problems including aggressive (i.e., cruelty to others) and oppositional behaviors (e.g., defiance towards authority, fits of temper) behaviors. Girls were placed into four groups of low (bottom 50th percentile), mid-low (51-70th percentile), mid-high (71-90th percentile), and high (91-100th percentile) for conduct problems. As level of disturbance *and range* of conduct problems at age eight increased, so did report of different antisocial activities including early sexual activity, affiliation with delinquent peers, early substance use, and truancy from school at age eighteen. Similarly, Deater-Deckard et al. (1998) found that aggressive-spectrum profiles predicted similarly for elevated problem scores in both boys and girls, concluding that when girls evidenced multiple determinants of acting-out behavior, their risks for later externalizing psychopathology were the same as boys. Findings from these studies suggest that when additional items reflecting negativistic and oppositional acting out behaviors are assessed, gender differences in rates of externalizing behaviors are diminished, compared to

assessments that focus on overt physical aggression alone.

These results suggest that developmental studies of high-risk girls may provide more information if oppositional behaviors are assessed in conjunction with more overt physical aggressive behaviors. In addition to aggressive and oppositional behaviors, children who follow the early-starting pathway to antisocial activities frequently show high rates of concurrent hyperactive and inattentive behaviors. Gender differences in the base rates of these behaviors and their implications for the study of early starting trajectories among girls are considered in the next section.

Hyperactive and Inattentive Behaviors. Both hyperactive and inattentive behaviors have been found to be associated with concurrent behavioral maladaptation in girls. For example, Woodward and Fergusson (1999) found that almost all of the girls with severe conduct problems also exhibited attentional problems (82% of the girls in the high conduct problem group did so). Conversely, in Gaub and Carlson's (1997) meta-analyses, girls with high rates of inattention demonstrated concurrent adaptational difficulties (i.e., social impairment) similar to boys. Biederman et al. (1999) followed 140 girls diagnosed with Attention-Deficit Disorder (hyperactive type) and 122 psychiatrically referred controls. Girls with ADHD were significantly more likely to have comorbid conduct disorder, oppositional defiant disorder, and one or more substance-use disorder than did girls in the comparison psychiatric group. Sharp et al. (1999) compared 42 girls diagnosed with ADHD with 56 comparison (ADHD) boys, and found no differences in the prevalence of parent or teacher-reported co-morbid externalizing problems. They did find, however, that ratings of comorbid inattention

(measured on TRF and CBC) were higher for girls than boys. Stormshak et al., (1998) found that in general, children (boys and girls) who were rated as hyperactive at home were likely to be rated hyperactive at school. In addition, co-morbidity of hyperactivity with aggression at home increased the risk that teachers and peers at school would rate children as aggressive.

It is clear that hyperactive and inattentive behaviors are frequently associated with concurrent problems in girls. Perhaps less clear, however, are potential gender differences in hyperactivity and inattention. The following section will discuss two issues that may effect gender differences in rates of hyperactive and inattentive behaviors.

Gender differences. Psychiatric rates of diagnoses of Attention Deficit Hyperactivity Disorder (ADHD), based on clinic samples, reveal significant gender differences (as high as 10:1) (APA, 1994; Biederman, et al , 1999; Hartung & Widiger, 1998). Arguably, this may be a result of the disproportionate rates of males being referred to school and community clinic offices (Verhulst & Van Der Ende, 1991), due to the higher rates of concurrent behavioral disturbances. However, when community-based samples are used to assess prevalence rates of symptoms, gender ratios are less marked for ADHD, sometimes as low as 2:1 (Sharp et al, 1999). Community samples are free from biases of gender differences in rates of psychiatric referral, and the findings suggest that to adequately assess gender differences in the emergence of problematic behaviors, researchers may need to be careful to include community-based samples in research, as reliance on clinic-referred samples may be biased by the high proportion of males.

Focusing on improving sample selection is one area that may improve the validity of rates of gender differences in hyperactive and inattentive behaviors. Additionally, researchers have looked at the utility of assessing hyperactive and inattentive behaviors as separate dimensions in order to elucidate the relation of hyperactivity and inattention to various negative outcomes. Recent studies demonstrate that while hyperactive and inattentive behaviors frequently co-occur in children (Barkley, 1982), these dimensions can be reliably differentiated (Stormshak et al, 1998), and gender differences between the dimensions may vary (Gaub & Carlson, 1997; Hartung & Widiger, 1998). As one example of how discrimination of the dimensions may provide potential benefits in understanding gender differences, Arnold (1996) published a summary of the National Institute of Mental Health (NIMH) conference on sex differences in ADHD. In this summary, it was noted that to date, most studies have found that while girls showed lower levels of hyperactivity than boys, they demonstrate similar rates of inattention. Thus, what appeared to be large gender differences in attentional difficulties were actually attributable to the dimension of hyperactivity -- girls appear to suffer from inattention at similar rates as boys.

As can be seen from the previous studies, hyperactive and inattentive behaviors can be reliably assessed as different dimensions, and indeed, when they are, gender differences diminish for the dimension of inattention. The following section will highlight what is known in the literature about the ways in which the dimensions of hyperactivity and inattention influence future maladaptation in girls.

Prediction of hyperactive - inattentive behaviors to maladjustment. Research has

demonstrated that both inattentive and hyperactive behaviors, when assessed as separate dimensions, may serve as unique predictors of maladjustment for girls. For example, Achenbach et al. (1995) found that teacher and parent-reported attention problems in girls predicted to later mental health utilization for girls and not for boys. In a study of psychiatrically-referred girls, Biederman et al. (1999) found that the dimension of inattention served as a more powerful predictor of maladjustment (i.e. co-morbid disorders) than did hyperactivity. Contrary to this finding, another found hyperactivity to be a stronger predictor of conduct problems than inattention, but in this study there was no mention of gender make-up of the sample, so the applicability is greatly limited (Taylor, Chadwick, Heptinstall, & Danckaerts, 1996). Interestingly, several studies have found that over the years, rates of hyperactivity diminish at a faster and greater rate than those for inattention. For example, August, Braswell and Thuras (1998), found that for both boys and girls, measures of attention problems tended to decline less over time than did the measures of hyperactive items, suggesting increased stability over time for this dimension of inattention. Thus, the role of inattention may be an important component to understand in the development of antisocial problems in girls, given the lack of demonstrated gender differences with this dimension. In addition, while it still maintains large gender differences, hyperactivity is also a predictor of future antisocial problems. Accordingly, developmental models for the emergence of antisocial activity in girls would be wise to assess these dimensions as part of a multi-problematic profile of dysregulated behaviors.

Summary. The review of research regarding behavioral characteristics suggests

that both early-starting and delayed-onset patterns may characterize the development of conduct problems in girls. In general, the reviewed studies revealed that 1) elevated rates of aggression in elementary school girls predict to later maladjustment as they do for boys, and also that 2) an associated spectrum of dysregulated behaviors including opposition, hyperactivity, and inattention may place girls at a significant disadvantage, as they do for boys. The next section of the literature review will look at associated risks in the development of conduct problems for girls. In particular, the following section will underscore the evidence suggesting that adaptation markers may elevate developmental risk patterns and that antisocial activity is frequently associated with concurrent conduct problems.

#### Associated risks: Adaptive Difficulties and Concurrent Negative Outcomes

Peer Status and Conduct Problems. Peer rejection -- active dislike by peers in conjunction with a lack of positive regard by peers -- has been shown to be a powerful predictor of future antisocial behavior for boys (Cillessen et al, 1992; Hymel & Franke, 1985; Volling, et al, 1993). Peer problems serve not only as markers of risk for later conduct problems, but as processes which affect trajectories over time (Cillessen et al, 1992; Hymel & Franke, 1985; Volling, Mackinnon-Lewis, Rabiner, & Baradaran, 1993). The extent to which peer rejection is predictive of girls' later antisocial activity is unclear. Kupersmidt and Patterson (1991) found that grade-school girls (grades 2-4) who were rejected by their peers were six times more likely than girls rated "popular" by peers to have behavior problems as measured by teacher report two years later. Similarly,

Coie, Terry, Lenox, Lochman, and Hyman (1995) found that peer rejection for girls in third grade predicted to parent-reported aggression in sixth grade. Yet, there is inconsistency in the research regarding the association between peer rejection and later antisocial activity with girls. For example, Miller-Johnson, Coie, Maumary-Gremaud, Lochman, and Terry (1999) found that, while measures of peer rejection in third grade predicted to delinquency up to three-seven years later for boys, peer rejection was not a strong predictor of later delinquency for girls. The above studies suggest that further exploration is necessary to understand the role of peer rejection in promoting later antisocial activity among girls.

Academic difficulties and conduct problems. Research has demonstrated considerable overlap between academic difficulties in the school grades and conduct problems in early adolescence in boys (Hinshaw, 1992a; Maughan, Gray, & Rutter, 1985; Masse & Tremblay, 1999; Prior, Smart, Sanson, & Oberklaid, 1999). Most research to date looking at the role of academic difficulties and later conduct problems in girls has been follow-back in nature, and studies of incarcerated girls suggest that a lack of academic success was strongly associated with antisocial behavior in adolescence (Chesney-Lind & Sheldon, 1998). In one longitudinal study, Lewin, Davis & Hops (1999) followed both girls and boys longitudinally and found that for girls, regardless of the measure of antisocial behavior, early academic problems were the strongest predictors of future conduct problems, while for boys, aggression coupled with peer rejection were the most predictive of later conduct problems. The authors conclude that: "It is quite possible that academic failure, for girls, is indicative/ a proxy of/ an early norm-breaking

behavior pattern that is associated with later antisocial behavior” (pg. 289). This study suggests that academic difficulties may play as powerful a role in the development of antisocial behavior in girls, perhaps even more so than early-starting boys.

Additive effects. In the prediction of developmental trajectories, a more complete model of pathological development can occur when individual behaviors are combined with associated risk factors (Rutter, 1989). Research has demonstrated clear relationships among peer and academic difficulties and the behavioral characteristics highlighted earlier in this review (Gresham, Macmillan, Bocian, Ward, & Forness, 1998; Hinshaw, 1992a Moffit, 1993; Masse & Tremblay, 1999; Rubin, Chen, & Hymel, 1993). By examining aggressive and dysregulated behaviors within the larger setting in which they occur, a more thorough and meaningful understanding of trajectories leading to preadolescent conduct problems patterns may emerge (Cicchetti, 1984; Sroufe & Rutter, 1984). The next and final section of this review of research will highlight the risky outcomes associated with conduct problems in adolescents: substance use and sexual activity.

Concurrent Adolescent Risky Outcomes. Conduct problems in adolescence frequently occur in the context of other risky activities including substance use and sexual activity (Chesney-Lind & Brown, 1999). Each, in turn, has been associated with poor adult adjustment (Newcomb, Maddahian, Skager, & Bentler, 1987; Robins, 1986). The potential contingent relationship among these risky activities is important to consider. High-risk pre-adolescents are more likely to use alcohol or drugs when engaging in sexual activity (Zabin & Hayward, 1993), and drug use is likely to emerge

following antisocial behaviors (Elliot, Ageton, & Huizinga, 1985). Ultimately, the co-occurrence of risky outcomes has significant implications for prognosis into adulthood, as co-morbid patterns are more common for life-course persistent antisocial girls than for adolescent-limited girls (Moffitt, 1993).

It has been postulated that antisocial behavior, substance use, and early sexual activity all represent the same underlying penchant for norm-breaking behaviors and therefore each share similar risk factors (Jessor, 1992). Indeed, Woodward & Fergusson (1999) found that aggressive-spectrum behaviors including opposition and measured at age 8 predicted to early substance use and sexual activity in girls at age 15, and other empirical examinations have yielded similar results (Fergusson & Horwood, 1996; Fergusson & Lynskey, 1997; Harvey & Spigner, 1995). These findings, taken together, suggest that examination of the associations among early antisocial activity, substance use, and sexual activity may reveal not only important information regarding shared mechanisms of risk, but predictive information regarding continued psychosocial difficulties.

### Chapter 3: Summary of Literature Review and Goals for the Present Study

The negative outcomes for conduct problematic adolescent females include early motherhood, dependence on welfare, and psychiatric disorders (Bardone et al., 1996; Chesney-Lind & Brown, 1999). Preventionists argue that early detection of risk is key to providing the most effective prevention of future pathology (Coie, et al., 1993). This review of research suggests several areas worth pursuing in an attempt to delineate developmental risk trajectories in the emergence of conduct problems in girls. First, while there are unequivocal gender differences in rates of physical aggression (Achenbach, 1991; Maccoby, 1990), when girls show elevated rates of aggression in the early years their risk for later conduct problems appears similar to boys (Brody, et al., 2003; McFayden-Ketchum et al., 1996). Second, while gender differences are greatest for overt, physical forms of aggression, they are less marked for other related forms of dysregulated behaviors including opposition, hyperactivity, and inattention (Keenan & Shaw, 1994; Webster-Stratton, 1996). In turn, each of these behaviors has been associated with girls' adolescent conduct problems (Biederman et al., 1999; Woodward & Fergusson, 1999). Third, the review of research reveals that by examining behavior problems (aggression, oppositionality, hyperactivity, inattention) as a spectrum, different combinations of behaviors may present unique information to facilitate delineation of models of risk for girls (Gaub & Carlson, 1997; Pulkkinen & Pitkanen, 1993). Finally, the review of research suggests that peer and academic markers of adaptation may

provide important information to predict developmental trajectories in constellation with behavioral characteristics (Coie et al., 1995; Shaw et al., 1997), and in addition, that assessment of concurrent problematic behaviors in early adolescence may provide necessary information regarding the potential for shared risk factors (Woodward & Fergusson, 1999).

### Goal and Hypotheses of Study

The goal of this study is to add valuable information to the research base regarding the grade-school developmental trajectories associated with the emergence of early conduct problems in girls. To facilitate this goal, the study will 1) examine the occurrence of early problematic behavior in a high-risk sample of both boys and girls, allowing for gender comparisons regarding the emergence of behaviors at this young age, 2) examine the kindergarten behavioral characteristics associated with adolescent conduct problems, including an assessment of spectrum-patterns of risk, and 3) examine the potential cumulative risk of academic and peer difficulties in the development of conduct problems in both boys and girls. Particular hypotheses for each of these areas of examination are presented next.

Occurrence of Early Problematic Behavior. In addition to testing specific hypotheses about gender similarities and differences in the early predictors of adolescent antisocial behavior, this study will explore the prediction of two other risk adolescent behavior problems – substance use and sexual activity. The degree to which antisocial behaviors are related to concurrent substance use and sexual activity among girls and

boys will be examined and compared. Substantive overlap among these adolescent problem behaviors is expected for boys and girls. In addition, it is anticipated that the early developmental precursors for substance use and early sexual activity will show similarity with the predictors of antisocial activity.

Tests of Predictive Models. It is hypothesized that aggression (measured as a narrow-band dimension), will demonstrate predictive utility to 7<sup>th</sup> grade conduct problems, and further hypothesized that predictive ability will be strengthened by the inclusion of associated dysregulated behaviors (e.g., hyperactivity, opposition, and inattention), creating an aggressive-spectrum profile that is highly predictive of conduct problems. Also, it is expected that additive risk will exist when behavioral characteristics are coupled with potential adaptation difficulties (peer and academic problems). Based upon prior research, it is hypothesized that cumulative consideration of these markers, in addition to behavioral characteristics, will add unique predictive utility for both boys and girls.

Aggressive-Spectrum Behavior Patterns. First, it is hypothesized that a small number of girls will show an aggressive-spectrum pattern of behavior at school entry, and these behaviors will be associated with early conduct problems. That is, these girls will follow the same early-starting pattern as boys. Gender differences are expected, with more boys than girls anticipated to demonstrate this pattern. Second, it is hypothesized that another group of girls will follow a delayed-onset pattern. These girls will show vulnerabilities associated with the development of aggression at school entry (elevated levels of oppositional, hyperactive, and inattentive behavior), but will not show overt

aggression, and this profile will also be associated with later early antisocial activity. No gender differences are expected for this pattern.

## Chapter 4: Method

### Participants

747 participants (317 girls, 430 boys) were drawn from the high-risk control and normative sample of the Fast Track project, a multi-site study of the development and prevention of conduct disorder (Conduct Problems Prevention Research Group, CPPRG, 1992). Participants were drawn from schools serving economically disadvantaged populations in four geographically diverse regions of the United States -- Durham, NC, public school system with a predominantly low- to middle-SES African American population, Nashville, TN, a moderate sized city with a mix of low- to middle-SES, African-American and Caucasian families, Seattle, WA, low- to middle- SES, ethnically diverse population, and rural central Pennsylvania, predominantly low- to middle-SES Caucasian families.

In the spring, all of the kindergarten children in the 55 participating elementary schools at the four sites of the Fast Track project were screened using teacher ratings from the Authority Acceptance behavior problem scale from the Teacher Observation of Classroom Adaptation - Revised (TOCA-R; Werthamer-Larsson, Kellam, & Wheeler, 1991). Children were randomly selected for the normative sample from each decile of the distribution of behavior problems on the Authority Acceptance scale, in order to represent the population at each site according to race, gender, and distribution of behavior problems. A two-step screening process was used to select participants for the high-risk sample (see Lochman & CPPRG, 1995, for more details). High-risk control

children were selected from those who scored in the top 35% of behavior problems at school and whose parents agreed to participate in a phone interview screening (the Parent Screen). The Parent Screen was a 24-item scale of conduct problems derived from the aggression scale of the Child Behavior Checklist (Achenbach, 1991) and the Revised Problem Behavior Checklist (Quay & Peterson, 1987). Based upon the average teacher and parent problems scores, behaviorally disruptive children were then chosen for the high-risk control sample at each site. The selected participants represented the top 10%-15% of the sampling population at each site in terms of their cross-situational problem behavior ratings. The normative sample (N = 387) was selected only from the set of schools randomly assigned to the control condition, so that estimates of regional norms were not affected by intervention. 79 students overlapped between high-risk and normative status. Neither the high-risk control nor the normative sample used in the present study received any of the Fast Track preventive interventions.

### Measures

#### Kindergarten

Aggression, hyperactivity, opposition, and inattention. The Child Behavior Checklist-Teacher Report Form (CBCL-TRF), and Child Behavior Checklist- Parent Form (CBCL-PRF) (Achenbach, 1991) each contains a list of 113 behavior problem checklist items that teachers and parents, respectively, rate on a three point scale (0 = not true to 2 = very true or often true).

Although a standardized scoring system was developed for this measure based on

factor analyses of large samples of children aged 6-12 (Achenbach, 1991), this standard scoring system did not provide a clear discrimination between oppositional, aggressive, inattentive and hyperactive behavior problems needed to test the hypotheses of this study.

In a previous study (Stormshak et al., 1998), a confirmatory factor analysis was undertaken to determine whether these three narrow-band dimensions of disruptive behavior problems (e.g., oppositional, aggressive, hyperactive) were discriminated in teacher and parent CBCL ratings. Items were chosen based upon DSM-IV criteria to create three theoretically distinct scales which mirrored the three separate diagnostic categories of ODD, CD, and ADHD. Confirmatory factor analyses supported these clinically-relevant subscales. Based on that study, the following 7 items were used to compute a subscale representing oppositional behavior problems: argues a lot, disobedient, stubborn, irritable, sudden changes in mood or feelings, sulks a lot, temper tantrums, whining. The following 9 items were used to create the aggression scale: cruelty and bullying, destroys own things, destroys others things, lying or cheating, gets in many fights, physically attacks people, teases a lot, threatens people, swearing. The following 4 items were used to create a hyperactivity scale: can't sit still/ restless, impulsive/acts without thinking, talks too much, unusually loud. In the Stormshak et al. (1998) study, correlations between the scales were between .65-.71. The following 6 items from the Attention Problems subscale of the CBCL were summed to create an inattention scale: can't concentrate, daydreams, confused, poor school-work, stares blankly, and acts young. In this study, the inattention scale had an alpha of .95 and was moderately correlated with the other narrow-band dimensions ( $r_s = .42 - .65$ ).

### Fourth Grade

Peer relations. Measure of peer relations were obtained during the child's fourth grade year using standard sociometric interviews. Children in all participating classrooms who received parental permission to participate (75-80% in most classrooms) were interviewed. Children were asked to list the classmates they liked most and those they liked the least. Unlimited nominations were accepted. Following the Coie and Dodge (1983) procedure, the difference between the like most and like least scores were standardized within classroom and used as an index of social preference.

Academic measure. Assessment of academic progress was obtained at the end of the child's fourth grade year from archived school records. The School Records Form (SRF), a modified version of the School Archival Records Survey (SARS: Walker, Block, Todis, Barckley & Severson, 1988) was used to obtain reliable information including language arts and mathematic grades. For the purposes of quantitative data, the SRF provides a numerical system for recording grades; it spans a 13 point scale (1 = "E" or failed to 13 = "A" or highest grade possible). Language arts and mathematic grade scores were summed to provide an overall cumulative academic score that could range from 2 – 26.

### Seventh Grade

Antisocial activity. Youth responded to items from the Self-Reported Delinquency measure (Loeber, Stouthamer-Loeber, van Kammen & Farrington, 1991), a

22 item self-report measure of various delinquent activities including vandalism, status offenses, theft, assault, and public disorder. It is an adaptation of the National Youth Survey, (Elliot, Huizinga, & Ageton, 1985), a widely used assessment of delinquent and antisocial behavior and has consistently high reliability and validity. Summary scores of general delinquency (range of 0 – 22) have been shown to have high internal consistency with both normative and risk samples (.88 and .75, respectively; Maumary-Gremoud, 2001). Descriptive analyses were conducted at the item level in order to explore potential gender differences in the specific antisocial behaviors engaged in by boys versus girls. However, for all other analyses, a dichotomous score was created which differentiated youth who reported no antisocial activity (0) from youth who reported engaging in any antisocial activity (1).

Early substance use. Youth responded to items from the Tobacco, Alcohol and Drugs Questionnaire (TADQ), and 11-item self-report measure of substance use. Items included smoking cigarettes, drinking alcohol, drinking alcohol without a parent/adult's knowledge, trying psychedelic drugs (LSD, PCP), speed/uppers/ice, heroin, pills not prescribed by a doctor, injecting illegal drugs, trying marijuana, cocaine, or "any other illegal drug". The TADQ is drawn from a subscale of the Child Health and Illness Profile – Adolescent Edition (CHIP – AE; Starfield et al., 1995), which has been shown to demonstrate high reliability in studies of urban and rural youth of diverse ethnicities (Starfield et al., 1995). For analyses, a dichotomous score was created for this measure, differentiating youth who reported no substance use (0) from youth who reported any substance use (1).

Early sexual activity. Youth responded to items from the Romantic Relationship Questionnaire (Sexual Behavior Subscale of the Child Health and Illness Profile – Adolescent Edition, CHIP – AE, Starfield et al., 1995). Emergence into early sexual activity was assessed by a dichotomous yes / no answer to the question “Have you ever had sexual intercourse”, which has been shown to demonstrate validity in studies of urban and rural youth of diverse ethnicities (Starfield, 1997). To address potential issues of sexual assault, endorsement of this item was discounted if mutually occurring with “have you ever been physically forced to have sexual intercourse against your will” (2 subjects were subsequently dropped from analyses).

## Procedures

### Kindergarten

CBCL. In the spring of the childrens’ kindergarten year, teachers were asked to complete the CBCL-TRF along with other measures provided in a teacher-rating packet. Teachers were asked to return the forms, when completed, to the Fast Track office. They were compensated according to respective school district assessment rates for completion of spring measures. In the summer of children’s kindergarten year, parents participated in a face-to-face interview conducted in their home with a research staff member who was blind to study status. The CBCL-PRF was administered towards the end of the 1 1/2 hour interview session. Parents were compensated \$50 for their participation in the interview.

#### Fourth Grade

Sociometric interviews. Children were interviewed individually in the school setting by member of the Fast Track staff. After making sure that children were acquainted with each of the other children on the classroom roster, the interviewer asked children to list the classmates they liked most and those they liked the least.

School records form. Following the completion of the school year, a member of the FAST Track research staff visited school record offices to collect archived school record information. In the case of children who had moved outside of the area, a telephone interview was conducted with a member of the school office staff, who relayed the required information.

#### Seventh Grade

Self-reported activity. Youth and parents were visited in their home in the summer following their seventh grade year. Youth were interviewed individually, and during this face-to-face session, an interviewer (blind to study status) provided instruction to the youth in using a laptop computer to respond to questions about their personal activities. The actual measures were completed independently by the youth using the computer-laptop. The measures were audio-assisted, so that youth could listen (through headphones) as well as read the questions (on the computer screen). The interviewer was available in the room if any questions arose during the computer portion of the interview, but the interviewer could neither hear nor see the answers given by the youth. This procedure was implemented to insure the highest level of confidentiality and security in

hope to procure increased validity in self-reports of antisocial behavior, substance use, and sexual activity. Youth received \$20 compensation for their participation.

## Chapter 5: Results

The overall goal of this study was to add to the research base regarding the grade-school behavioral characteristics associated with the emergence of early adolescent problem behavior among girls. This study examined the occurrence of early problematic behavior in a high-risk sample of both girls and boys, allowing for gender comparisons regarding the emergence of behaviors at this young age. This study also assessed the utility of additive-risk in behavioral characteristics and markers of adaptation difficulties in predicting the emergence of antisocial behaviors and related risky behaviors (substance use and sexual activity) in early adolescence. Finally, this study examined the degree of gender differences to which differential behavioral patterns in kindergarten would be related to antisocial activity in 7<sup>th</sup> grade. The results are broken into the following three main sections: 1) description of the nature and inter-relations among the three targeted problematic outcomes in early adolescence, including gender differences, 2) examination of the predictive contributions of early behavior problems (e.g., aggression, oppositionality, hyperactivity, and inattention) and adaptation difficulties (e.g., peer and academic problems) to the emergence of antisocial behavior and other risky adolescent behaviors (e.g., substance use, sexual activity) for boys and girls, and 3) examination of potential gender differences in patterns of behavior associated with the early- and delayed-onset models.

### Description and Assessment of Outcomes

To assess potential gender differences in the degree to which youth reported engaging in any of the targeted problematic outcomes (antisocial behavior, substance use, sexual activity), descriptive analyses were undertaken with the 7<sup>th</sup> grade outcome measures. T-tests were run to compare rates reported by girls versus boys. To further describe the emergence of problematic behaviors in 7<sup>th</sup> grade, the interesting question of inter-relationships among the three risky outcomes were assessed with Pearson correlations and chi-squares. Finally, conditional probabilities tested the possibility that engagement in one activity could be predicted by engagement in another (i.e., sexual activity GIVEN delinquency), or more importantly, the possibility that emergence of one behavior (i.e., delinquency) may increase the probability of emergence in another (i.e., sexual activity). In each of these analyses, potential gender differences in problem outcome inter-relations were explored.

Rates of individual antisocial behaviors by gender. Given the central focus in the present study on gender differences in antisocial behavior, rates of initiation of each of the antisocial behaviors reported by youth are listed in Table 1 by gender. As can be seen in Table 1, by 7<sup>th</sup> grade, boys and girls in this high-risk sample report initiating engagement in most antisocial behaviors at similar rates. Notable exceptions, however, included carrying a hidden weapon and being rude/noisy in public (with boys reporting higher rates than girls), and avoiding paying for things (with girls reporting a higher rate than boys).

Next, the dichotomous score representing the proportion of youth who reported

engaging in any (vs. no) antisocial behavior was examined. For antisocial activity, 55% of boys (N = 180) reported early initiation of any antisocial behavior, which was significantly higher than 45% of girls (N = 108),  $t(617) = 3.073$ ,  $p < .01$ . Hence, although girls and boys showed a few differences at the item level, in terms of the specific antisocial behaviors they engaged in, boys were more likely overall than girls to engage in some antisocial behavior by seventh grade.

Rates of substance use and sexual activity by gender. Descriptive analyses were also undertaken with the 7<sup>th</sup> grade reports of engagement in substance use or sexual activity (both assessed with dichotomized scores indicating any substance use or sexual intercourse by early adolescence.) Among this high-risk sample, for substance use, 34% of boys (N = 116) and 30% of girls (N = 72) reported early use of any item (e.g., tobacco, alcohol, marijuana), which was not a statistically significant difference,  $t(619) = .40$ ,  $p > .10$ . For self-report of sexual activity, 22% of boys (N = 78) endorsed being sexually active, which was significantly higher than 11% of girls (N = 24),  $t(617) = 4.39$ ,  $p < .001$ .

#### Relationships among outcomes.

Associations. Pearson correlations revealed significant associations between the three outcome indices ( $r_s = .27-.35$ ,  $p < .01$ ) for both genders and are shown in Table 2. Results of the correlations demonstrate that, for both boys and girls, initiation of any one of the three problematic outcomes was associated with initiation of the others. Additionally, six chi-square analyses were then performed on each dichotomous problem

outcome (by gender). For girls, significant relationships were found between engagement in antisocial behavior and substance use,  $\chi^2(1, N = 259) = 37.43, p < .001$ , antisocial behavior and sexual activity,  $\chi^2(1, N = 259) = 27.32, p < .001$ , and sexual activity and substance use,  $\chi^2(1, N = 262) = 30.03, p < .001$ . For boys, similar significant relationships were found between engagement in antisocial behavior and substance use,  $\chi^2(1, N = 347) = 46.09, p < .001$ , antisocial behavior and sexual activity,  $\chi^2(1, N = 347) = 33.34, p < .001$ , and sexual activity and substance use,  $\chi^2(1, N = 348) = 76.86, p < .001$ . Results of each chi-square support the correlation results demonstrating that for boys and girls, a statistically significant relationship exists between any given two given problematic outcomes.

Conditional Probabilities. Of particular interest was the possibility that engagement in antisocial activity might increase the likelihood that youth would engage in other risky behaviors (substance use or sexual activity). To assess the potential existence of *progressions* in the emergence of problematic behaviors with both boys and girls, unconditional and conditional probabilities were computed to represent the likelihood of engagement in each of these problem behaviors overall, and particularly the likelihood of engagement in substance use or sexual activity, given antisocial behavior. Overall Z-test comparisons revealed that for boys and girls, the probability of engagement in any one risky activity increased with engagement in another activity. Table 3 shows these conditional probabilities as well as Z-test comparisons of the probabilities. For both boys and girls, the conditional probability of engagement in *only one* activity was lower than the unconditional probability of engagement in *any* activity.

Also for both boys and girls, the highest probability of engagement in *any* activity was found if there was already engagement in *two others* (i.e., all three activities).

With regard to “gateway” progressions, it is notable that, in terms of unconditional probabilities, both boys and girls were most likely to engage in antisocial activity (45-55% did so) and least likely to engage in sexual activity (11-22% did so), with rates of engagement in substance use in between (30-34%). When these risky behaviors occurred alone (e.g. without either of the other risky behaviors), antisocial activity was most likely to occur in isolation for both boys and girls (33-43% of the youth engaging in antisocial activity did so without engaging in either substance use or sexual activity.) Sexual activity was least likely to occur in isolation (only 2-8% of the youth who reported engaging in sexual activity reported no antisocial activity or substance use.) These proportions suggest that antisocial behavior is often the first risky behavior initiated by young adolescents, and may provide entry into a peer group or “life style” context in which opportunities and reinforcement for substance use and sexual activity increase.

Further inspection of the probabilities in Table 3 reveals an interesting hierarchical relationship among the three outcomes. Of those youth who reported engaging in antisocial activity, many also reported substance use (45% of the girls and 46% of the boys) and sexual activity (20% of the girls and 30% of the boys). Engaging in antisocial activity thus substantially increased risk for substance use and sexual activity for both boys and girls. Conversely, youth rarely reported substance use without also reporting antisocial behavior. That is 69% of the boys and 74% of the girls who engaged

in substance use also reported engaging in antisocial behavior. Even more dramatic were rates of antisocial behavior reported by youth who engaged in sexual activity. Of those reporting sexual intercourse, 85% of the girls and 77% of the boys also reported engaging in antisocial behavior. Hence, girls in particular rarely initiated sexual activity unless they were also engaging in antisocial activity.

It should be noted that engaging in substance use also increased youth risk for sexual activity. Among youth who engaged in substance use, 24% of the girls and 42% of the boys reported sexual activity. It was very rare, however, for a youth to report substance use and sexual activity without also reporting antisocial behavior. Indeed, 89% of the girls and 85% of the boys who used substances and were sexually active also reported antisocial activity.

With regard to gender similarities and differences, patterns evident in the conditional probabilities appear similar to those evident in the unconditional probabilities. That is, gender differences are smallest for substance use, in which unconditional probabilities show no significant gender difference. Engagement in antisocial activity increased the conditional probability of engagement substance use by 12-16%, while engagement in sexual activity increased the conditional probability of engagement in substance use by 32-38% (doubling the unconditional probability of engagement). Thus, it appears that initiation of substance use and its relation to antisocial behavior and sexual activity is very similar for both genders among identified high-risk early adolescents. In terms of initiation of sexual activity, boys showed significantly higher base-rates of sexual activity than did girls. Engaging in antisocial behavior and

substance use increased risk for sexual activity for both boys and girls, with the base-rates continuing to be higher among boys. Engaging in antisocial behavior thus appears to raise risks for sexual activity for both girls and boys in similar ways, accounting for the gender-related base rate difference.

### Predictive Relations Between Kindergarten Behavioral Characteristics, 4<sup>th</sup> Grade Markers of Adaptation, and Early Adolescent Conduct Problems.

In the second section, several steps were required in order to assess the predictability of kindergarten indices of problematic behavior and fourth grade markers of adaptation on problematic outcomes in seventh grade. First, preliminary data analysis including missing variable analyses and multi-collinearity diagnostics were performed. Second, hierarchical logistic regressions were used to test 1) whether “spectrums” of behaviors (e.g., aggression with or without hyperactivity/inattention/opposition) would differentially contribute to model development, and 2) whether the additive-risk model of 4<sup>th</sup> grade markers of adaptation (academic grades and sociometric scores) improved the predictability of behavioral characteristics. Third, person-oriented profile analyses were conducted to test gender patterns of spectrums of kindergarten behavior (aggressive-dysregulated, nonaggressive-dysregulated) and antisocial activity.

### Preliminary Analyses.

Missing-variable analyses. A missing variable analysis (MVA; SPSS, 2002) was used to assess the degree to which the missing data might be traceable or predictable

from other variables in the database, rather than being due to the specific variable on which the data are missing. The missing variable analysis revealed that the missing data was not significantly different across variables  $p > .10$ , and therefore as a conservative approach, imputation methods such as multiple imputation or expectation maximization were not utilized and missing data was treated with case-wise deletion (Heijtan, 1997).

Multi-collinearity assessment. In terms of screening for multicollinearity among the predictor variables, the correlations between the predictor variables (Tables 4 and 5) were significant, but below the .80 cut-off for risk of potential violation (Menard, 1995). To be conservative, a further screen of the standard errors between the variables during model fit was examined (Tabachnick & Fidell, 1996). This screen revealed no significant discrepancies, and therefore the issue of multicollinearity was not judged to affect interpretation.

### Hierarchical Logistic Regressions.

Overview of logistic regression approach. The goal of hierarchical logistic regression is to correctly predict the category of outcome (disease/no disease) for individual cases using the most parsimonious model. Model building for these series of regressions was based on the log-likelihood approach (stepwise likelihood ratio test) in order to account for potentially large standard errors associated with large regression coefficients (Norusis, 1999). The first two blocks were entered in such a way as to allow testing whether dysregulated behaviors (hyperactivity, opposition, inattention) would add information to the model above and beyond teacher and parent rated aggression. Thus,

the initial block included teacher and parent rated aggression, and the next contained the remaining 6 behaviors (hyperactivity, opposition, inattention; parent and teacher report). Finally, to test the additive-risk model of grade-school markers of adaptation, in each of the logistic regressions academic and peer ratings sociometric scores were forced in the model in the third block.

For each of the predictor variables, continuous covariates were used, as use of categorical predictor variables can greatly reduce statistical power (Menard, 1995). Each predictor variable was centered on the mean to allow for standardization and to further reduce the potential of multicollinearity effects (Aiken & West, 1991; Menard, 1995). Model fit (deciding whether either block contributed significantly more information than a constant-only model) was determined by examining Naglekerke  $R^2$  and Chi-Square improvement in model fit tests. Detecting interaction effects in logistic regression requires one to have a sufficiently large sample with enough power (Aiken & West, 1991; Jaccard, 2001), and a power analyses (p .35) revealed that interpretation of gender interaction effects with this data would lead to questionable results. To be conservative, logistic regression equations were run separately by gender. Following the identification of the best model, the next step involved assessment of individual predictors that contributed to overall model fit using Wald tests of significance and Odds Ratios. Odds Ratios measure the odds of predicting the negative outcome over the odds of not predicting the negative outcome. In other words, odds ratios answer the question “to what degree are children who show (predictor variable) more likely to endorse (outcome) than not?” Model fit statistics for each of the logistic regressions are presented in Table

6.

Model Fit -- Antisocial Activity. The aggression variables entered together in Block 1 were significant indicators of later antisocial activity for girls, but not boys. Inclusion of the remaining behaviors on Block 2 enhanced model fit for girls, suggesting that when aggression is part of an aggressive-spectrum profile it is more predictive of later antisocial activity for girls. With the inclusion of the remaining behaviors on Block 2, there was a significant model fit for boys. It appears that an aggressive-spectrum pattern was *necessary* to predict antisocial activity in this sample of boys. In terms of the additive nature of academic and peer ratings, for both boys and girls, inclusion of these variables resulted in significant overall models. However, there was incremental *reduction* in model fit as compared with the model that included aggressive-spectrum behaviors alone, suggesting that grade-school markers of peer and academic adaptation slightly reduced the significant predictive information provided by knowledge of aggressive-spectrum behavioral characteristics.

Model Fit -- Substance Use. The aggression variables entered together in Block 1 were significant indicators of later substance use for both girls and boys. As reflected by increases in  $R^2$ , the inclusion of hyperactive, oppositional, and inattentive behaviors in Block 2 added a significant amount of unique information above and beyond teacher and parent rated aggression for both boys and girls. In terms of the additive nature of academic and peer ratings, for girls, inclusion of these variables resulted in significant overall models, but only an incremental increase in overall chi-square, revealing no

relative *improvement* in model fit. For girls, this suggests that as with antisocial activity, aggressive-spectrum behaviors are significant predictors and grade-school markers of adaptation do not add significant predictive information above and beyond knowledge of behavioral characteristics. For boys, the additive-risk model (inclusion of academic and peer ratings in the third block) improved upon the aggressive-spectrum behavioral characteristics in a slight incremental fashion raising  $R^2$  by .01. These findings provide limited support to suggest that for boys, in the prediction of substance use outcomes, grade-school markers of adaptation may add a slight amount of information above and beyond behavioral characteristics. Unambiguous findings, however, are the improvements in model fit for both girls and boys when a constellation of aggressive-spectrum behaviors is included in the model (e.g., ratings of hyperactivity/opposition/inattention are added to kindergarten ratings of aggression).

Model Fit -- Sexual Activity. The aggression variables entered together in Block 1 were significant indicators of early sexual activity for both girls and boys. As reflected by increases in  $R^2$ , the inclusion of behaviors in Block 2 added a significant amount of unique information above and beyond teacher and parent rated aggression for both boys and girls. For girls, the additive-risk model (inclusion of academic and peer ratings in the third block) improved upon the aggressive-spectrum behavioral characteristics significantly, seen by increased chi-square and  $R^2$ . These results for girls suggest that when testing models of prediction to early sexual activity, grade-school markers of adaptation provide unique information above and beyond behavioral characteristics, and should be included in theory testing. For boys, the additive-risk model (inclusion of

academic and peer ratings in the third block) did not improve upon the aggressive-spectrum behavioral characteristics significantly, as seen by the relatively motionless chi-square and  $R^2$  statistics.

Individual Predictors. Assessment of Odds Ratios statistics revealed the following about the individual predictors. Aggression was a significant predictor for girl's antisocial activity and sexual activity. Specifically, teacher rated aggression predicted to antisocial activity ( $\underline{W} = 8.74, p < .01; OR = 1.3$ ) while parent rated aggression predicted to sexual activity ( $\underline{W} = 4.18, p < .05; OR = .66$ ) in girls. Aggression was found to be a significant predictor for boys (as well as girls); teacher rated aggression predicted to their substance use ( $\underline{W} = 6.41, p < .01; OR = 1.1$ ), and sexual activity ( $\underline{W} = 15.64, p < .001; OR = 1.4$ ). In terms of dysregulated behaviors, evidence was found for the unique predictive relation of teacher rated hyperactivity to sexual activity for boys ( $\underline{W} = 5.92, p < .05; OR = .75$ ). Finally, academic grades added unique information above and beyond behavioral characteristics in the test of girls' trajectories of early sexual activity ( $\underline{W} = 3.75, p < .05; OR = .91$ ).

Summary of logistic regression findings. Overall, the results of these logistic regressions provide considerable support for the hypothesis that assessment of models of conduct problem development using aggressive-spectrum behaviors will increase predictive utility. For each gender and with each outcome, the inclusion of hyperactivity/inattention/opposition *after* accounting for aggression significantly improved model fit. Indeed for boys, this addition was necessary in regards to explaining antisocial activity. The results, however, are mixed regarding our hypothesis posing the

additive-effects of peer and academic markers of adaptation to behavioral characteristics. For both boys and girls, when examining trajectories leading to antisocial behavior, the additive-model (peer and academic ratings) did not contribute significant information above and beyond that of behavioral characteristics. While strong support was found for the benefits of the adaptation additive-model when predicting sexual activity for girls, mixed results were found for the prediction of substance use for both genders. Assessment of individual predictor variables validates the results of the model-fitting stage and stated hypotheses; specifically that aggression can serve as a powerful predictor of later conduct problems, particularly when it is part of a larger aggressive-spectrum of behavioral problems.

#### Profile analyses of Aggressive and Dysregulated Patterns.

In this previous section, model testing revealed that in this high-risk sample of girls and boys, the combination of aggressive behaviors and a broad spectrum of dysregulated behaviors including opposition, inattention, and hyperactivity provided the optimal prediction of antisocial behavior in early adolescence. These findings are consistent with an early-starting model predicting antisocial outcomes for girls as well as boys. However, as a variable-oriented analyses, these regressions did not examine problem profiles for individual children, leaving open the question of whether a greater proportion of antisocial boys than girls fit the early-starting profile. Person-oriented analyses are needed to determine how many girls (as opposed to boys) fit the early-starting model, characterized by high rates of aggressive and dysregulated behaviors

shown at school entry, and how many show a delayed onset pattern in which antisocial behavior emerges in early adolescence without evidence of elevated aggression at school entry.

In order to address these questions, person-oriented profiles were examined in detail in regards to antisocial behavior -- the major outcome variable of interest in this study. This narrow focus on one outcome allowed for an in-depth description of the unique and similar patterns of risk across and within gender. Previous research has identified three groups of children of interest to this study: 1) Aggressive-dysregulated; children with kindergarten teacher or parent rated aggression scores greater than .75 SD relative to the normative sample, 2) Nonaggressive-dysregulated; children with kindergarten parent or teacher rated opposition, hyperactivity, and/or inattention scores greater than .75 relative to the normative sample, and 3) No-problem. These profiles have demonstrated stability from kindergarten up to fourth grade (Bierman, Domitrovitch, & Fang, 2003). As can be seen in the base rate percentages provided in Table 7, consistent with prior research and current hypothesis, more boys than girls were characterized by a constellation of aggressive-dysregulated behavior characteristics in kindergarten. In turn, also as expected, more girls than boys were characterized in kindergarten by a constellation of nonaggressive-dysregulated behaviors. Similarly, more girls than boys were rated as not having any problems in their kindergarten year.

“Prospective” Findings. Data are reported in Table 7. Table 7 illustrates the proportion of girls and boys who demonstrated high levels of aggressive behavior at elementary school and also developed antisocial behavior in early adolescence. Although

more boys (N = 218) than girls (N=92) exhibited aggression at school entry, the outcomes for boys and girls were fairly similar. That is, 40% of the aggressive girls and 45% of the aggressive boys exhibited antisocial activity in early adolescence, suggesting a fairly similar level of predictability from early aggressive behavior to adolescent antisocial activity.

More girls (N = 94) than boys (N=88) exhibited dysregulated behaviors at school entry (e.g., hyperactive, oppositional, or inattentive) without concurrent aggression. However, the proportion of girls and boys who showed this nonaggressive-dysregulated problem profile at school entry and who became antisocial by adolescence was fairly similar – 34% of the girls compared to 40% of the boys. For both boys and girls, the highest rates of antisocial behavior were evident among children with aggressive-dysregulated behavior problems, the next highest were evident among children with dysregulated (but nonaggressive behavior problems), with lower rates of antisocial behavior evident among children without any elevated dysregulated or aggressive behaviors at school entry.

At first glance, these findings appear contradictory to the analysis of past research described by Silverthorn and Frick (1999), who argue that girls are more likely than boys to exhibit antisocial behavior in early adolescence without showing evidence of aggressive behavior in early childhood. However, this apparent contradiction may be explained by examining the numbers in a different way, using a follow-back perspective. That is, if one asks the question “how many of the youth who exhibited early antisocial activity also had a history of overt aggression?” notable gender differences emerge. Of

the 154 boys in this sample who exhibited antisocial behavior in early adolescence, 98 or 64% had histories of early aggressive behavior. In contrast, of the 94 girls who exhibited antisocial behavior in early adolescence, only 37 (or 39%) had histories of early aggressive behavior. The difference appears primarily due to the higher base-rate of overt aggression among boys at school entry, rather than a gender-related difference in the negative predictability of aggression when it does occur.

A second important implication of these numbers involves the interpretation of the delayed-onset pattern among girls. Silverthorn and Frick (1999) focus on the fact that a majority of girls who become antisocial show no history of early aggression. Indeed, in this study, only 39% of the girls who became antisocial exhibited early aggression, making it seem as if a large proportion of antisocial girls fail to show difficulties until early adolescence (e.g., delayed onset.) However, if the risks associated with nonaggressive but dysregulated behaviors are considered, a full 73% of the girls who became antisocial in this sample showed elevated levels of problem behaviors. Hence, girls may not so much show an unexplained “delayed-onset” pattern of antisocial behavior development as a pattern in which early signs of disruptive behavior development are characterized by hyperactive, oppositional, and/or inattentive behaviors without concurrent aggression.

Taken together, these findings suggest several things related to gender differences in patterns of risk. First, the findings that base rate differences in aggressive-dysregulated behaviors are higher for boys than for girls is striking. Further, the effect that these base rate differences have on “follow-back” assessment of associated profiles

was clear. For boys, unambiguous support was provided for the notion that when looking back from 7<sup>th</sup> grade to kindergarten behavior to assess potential associated factors, the aggressive-dysregulated spectrum was paramount. This same “follow-back” finding did not hold for girls. However, when looking *prospectively* at the risks associated with being aggressive-dysregulated at an early age, evidence was found that these behaviors follow similar “paths” to antisocial activity for girls as they do for boys. Interestingly, when looking prospectively, nonaggressive dysregulated patterns in boys and girls also showed a similar “path” to antisocial activity.

Table 1

*Rates of Individual Antisocial Behaviors by Gender*

	Girls	Boys
Run away from home	7% (16)	8% (39)
Skipped class/school	25% (57)	23% (116)
Lied about age to get something	12% (26)	12% (61)
Hitchhiked	<1% (2)	2% (10)
Carried hidden weapon	7% (16)	12% (62)
Been loud/roudy in public	14% (32)	<* 21% (106)
Begged for \$ from strangers	4% (8)	5% (24)
Been drunk in public place	3% (7)	3% (15)
Damaged other's property	10% (23)	12% (60)
Tried to start fire	<1% (2)	4% (19)
Avoided paying for things	7% (15)	>* 1% (55)
Stolen any item from a store	9% (21)	9% (44)
Stolen from a purse/wallet	<1% (2)	1% (5)
Stolen something from a car	<1% (2)	3% (17)
Knowingly bought stolen property	2% (4)	3% (14)
Taken vehicle w/out permission	<1% (2)	4% (19)
Tried to steal motor vehicle	<1% (1)	2% (11)
Used fake checks	0 (0)	1% (5)
Used credit cards w/out permission	<1% (1)	1% (3)
Tried to cheat someone	2% (5)	6% (31)
Attacked with the intent to hurt	<1% (2)	3% (14)
Hit someone	15% (33)	18% (92)
Used weapon to get \$	0 (0)	2% (10)
Thrown objects at people	8% (18)	11% (55)
Been involved in gang fight	4% (8)	6% (30)
Paid to have sex with someone	<1% (2)	3% (14)
Had sex with s/one against their will	<1% (1)	2% (8)
Sold Marijuana	3% (6)	3% (16)
Sold Herion/Cocaine/LSD	1% (3)	2% (10)

\* z-test comparison significant at the .01 level

Table 2

*Pearson Correlations of Reported Initiation of the Three Problem Outcomes by Gender*

	Antisocial		Substance		Sexual	
	Girls	Boys	Girls	Boys	Girls	Boys
Activity						
1. Antisocial	1.00	1.00	--	--	--	--
2. Substance	.32*	.27*	1.00	1.00	--	--
3. Sexual	.27*	.23*	.29*	.35*	1.00	1.00

\* = correlation significant at the .01 level

Table 3

*Conditional Probabilities of Engagement in Activities*

Engagement in activity:	Antisocial		Substance		Sexual	
	Girls	Boys	Girls	Boys	Girls	Boys
Proportions						
Unconditional	.45	.55*	.30	.34	.11	.22*
Conditional given:						
No other activity	.33 <sup>a</sup>	.43 <sup>a</sup>	.16 <sup>a</sup>	.17 <sup>a</sup>	.02 <sup>a</sup>	.08 <sup>a</sup>
Antisocial activity	--	--	.45 <sup>b</sup>	.46 <sup>b</sup>	.20 <sup>b</sup>	.30 <sup>b</sup>
Substance Use	.69 <sup>b</sup>	.74 <sup>b</sup>	--	--	.24 <sup>b</sup>	.42 <sup>b</sup>
Sexual Activity	.85 <sup>b</sup>	.77 <sup>b</sup>	.68 <sup>b</sup>	.66 <sup>b</sup>	--	--
Both other activities	.89 <sup>b</sup>	.85 <sup>b</sup>	.73 <sup>b</sup>	.73 <sup>b</sup>	.31 <sup>b</sup>	.48 <sup>b</sup>

<sup>a</sup> = Z-test significant at 0.001 level (smaller than Unconditional Proportion)

<sup>b</sup> = Z-test significant at 0.001 level (larger than Unconditional Proportion)

\* = t-test comparison of gender difference significant at .05 level

Table 4

*Correlations among Predictor Variables for Girls*

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
<b><i>Parent Rating</i></b>										
1. Oppositional	1.00	--								
2. Overt Aggression	.60**	1.00	--							
3. Hyperactivity	.56**	.59**	1.00	--						
4. Inattention	.44**	.42**	.56**	1.00	--					
<b><i>Teacher Rating</i></b>										
5. Oppositional	.20**	.31**	.58**	.39**	1.00	--				
6. Overt Aggression	.23**	.40**	.59**	.32**	.71**	1.00	--			
7. Hyperactivity	.22**	.34**	.50**	.36**	.71**	.74**	1.00	--		
8. Inattention	.08	.10	.26**	.37**	.47**	.24**	.37**	1.00	--	
<b><i>Gradeschool Markers</i></b>										
9. Academic Score	.05	-.07	-.14*	-.17**	-.20**	-.15**	-.25**	-.26**	1.00	--
10. Peer Preference	-.12	-.14	-.26**	-.21**	-.35**	-.29**	-.34**	-.17**	.21**	1.00

\*\* = correlation significant at the .01 level  
 \* = correlation significant at the .05 level

Table 5

*Correlations among Predictor Variables for Boys*

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
<b><i>Parent Rating</i></b>										
1. Oppositional	1.00	--								
2. Overt Aggression	.59**	1.00	--							
3. Hyperactivity	.51**	.57**	1.00	--						
4. Inattention	.43**	.44**	.49**	1.00	--					
<b><i>Teacher Rating</i></b>										
5. Oppositional	.09	.09	.16**	.16**	1.00	--				
6. Overt Aggression	.09	.20**	.23**	.15**	.76**	1.00	--			
7. Hyperactivity	.10	.14**	.32**	.19**	.63**	.63**	1.00	--		
8. Inattention	.04	.07	.08	.28**	.33**	.25**	.26**	1.00	--	
<b><i>Gradeschool Markers</i></b>										
9. Academic Score	-.05	-.15	-.16*	-.17**	-.29**	-.33*	-.35**	-.22**	1.00	--
10. Peer Preference	-.17**	-.28	-.22**	-.20**	-.29**	-.22**	-.26*	-.12	.31**	1.00

\*\* = correlation significant at the .01 level

\* = correlation significant at the .05 level

Table 6

*Logistic Regression Results: Model Fit Statistics for Antisocial Activity, Substance Use, and Sexual Activity*

	<b>Girls</b>		<b>Boys</b>	
	Chi-Square	R2	Chi-Square	R2
<b>Model Fit – Antisocial Activity</b>				
Block 1	11.80**	.11	.62	.01
Block 2	17.52**	.15	5.04*	.04
Block 3	17.42**	.15	5.04*	.04
n	145		180	
<b>Model Fit – Substance Use</b>				
Block 1	6.64*	.07	3.75*	.03
Block 2	13.20*	.13	11.28*	.08
Block 3	13.30*	.13	11.87*	.09
n	148		185	
<b>Model Fit – Sexual Activity</b>				
Block 1	9.23*	.14	19.60**	.16
Block 2	13.98*	.20	28.67**	.23
Block 3	16.91*	.24	28.68**	.23
n	147		181	

\*\* p < .01. \* p < .05.

Table 7

*Profile and Antisocial Activity: Base rate, Prospective, and Follow-Back Percentages By Gender*

	Girls			Boys		
	A	B	C	A	B	C
<b>Kindergarten Profile</b>						
Aggressive-Dysregulated	33.7% (92)	40.2% (37)	38.7%	77.3% (218)	45.0% (98)	63.9%
Nonaggressive Dysregulated	34.4% (94)	34.0% (32)	34.4%	14.2% (88)	39.8% (35)	22.6%
No Problem	31.8% (87)	28.5% (25)	26.9%	8.5% (63)	33.3% (21)	13.5%

A = Base rate of kindergarten profile by gender (number)

B = Prospective -- contingent % *within* profile endorsing antisocial activity (number)

C = Follow-back -- % endorsing antisocial activity who fit kindergarten profile

## Chapter 6: Discussion

### Prediction of Behavioral Characteristics and Adaptational Difficulties to Early Problematic Behaviors

A major goal of this 7-year longitudinal study was to examine school entry and developmental behavior patterns associated with the emergence of early adolescent conduct problems among high-risk girls and boys. Specifically, this study examined the ways in which grade-school aggression, other dysregulated behaviors, and adaptation difficulties (peer relation difficulties, poor academic performance) may operate in similar, or dissimilar processes for girls and boys to predict to later risk. To do so, the *additive* role of aggression and associated dysregulated behavioral characteristics (creating an aggressive-spectrum profile), as well as additive-risk fashioned by 4<sup>th</sup> grade academic and peer ratings were examined in related to 7<sup>th</sup> grade self-reported antisocial activity, substance use, and sexual activity.

Consistent with prior research (Lyons, et al., 1989; Serbin et al., 1993; Stattin & Magnusson, 1989), results from this study demonstrated that kindergarten aggression was predictive of later antisocial activity in 7<sup>th</sup> grade. Moreover, nonaggressive dysregulated behaviors (hyperactivity, oppositionality, inattention) added uniquely and additively to the prediction of antisocial behavior and related risky behavior problems for both boys and girls. For boys, these findings sustain previous research demonstrating that the broader set of disruptive-spectrum behaviors have more power to predict adolescent conduct problems than do aggressive behaviors alone (Loeber & Schmalings, 1984; Pope & Bierman, 1999), and also support the well-established early-starting model of the development of conduct problems in

terms of the predictability of early oppositional-aggressive behaviors (Patterson et al., 1989). For girls, the results of this study adds empirical support to the handful of studies which have demonstrated the utility of early aggressive behaviors to function in similar ways as they do for boys in explaining developmental trajectories of antisocial behavior in girls (Brennan, Hall, Bor, Najman, & Williams, 2003). It appears that the early-starting model, developed for boys to explain developmental trajectories of conduct problem behavior, worked well for this high-risk sample of girls. Moreover, these findings add a new and important piece of information to the emerging research base focused on this specific population. Specifically, in addition to support for early-patterns of aggression being similarly predictive for girls to later conduct problems, these results suggest that *just like* their male counterparts, a constellation of aggressive-dysregulated behaviors is more a powerful predictor of later conduct problems than is aggression alone.

Results were mixed regarding the additive-effects of peer and academic markers of adaptation to behavioral characteristics. For both boys and girls, when examining patterns leading to antisocial behavior, peer and academic ratings did not contribute significant information above and beyond that of behavioral characteristics. In addition, mixed results were found for the additive benefit of peer and academic ratings in prediction of substance use for both genders. For boys, the lack of significance of peer status is contrary to several research studies demonstrating peer problems to predict later antisocial activity above and beyond behavioral characteristics (Cillessen et al, 1992; Volling et al., 1993). It is possible that the contrary findings in this study may be due, in part, to the way in which the models were tested. Peer status was entered *after* aggression and nonaggressive dysregulated behaviors to

assess its' additive predictive ability. As aggression and dysregulation play a significant role in the emergence of peer problems and indeed the relationship may be transactional in nature (Kupersmidt, & Coie, 1990; Ladd & Mize, 1983; Rubin, Chen, & Hymel, 1993), examination of the additive risk model may not be sufficient. While beyond the scope of this study, it is likely that a transactional-risk model approach to model testing which includes tests of mediation would further elucidate their complex relationships (Baron & Kenny, 1986; Schwartz, et al., 1999).

Strong support was found for the benefits of the adaptation additive-model when predicting sexual activity for girls. Specifically, model variance was significantly improved with the inclusion of adaptation variables, and academic difficulty was a unique and significant predictor of girls' emergence in early sexual activity. Several possibilities can be proposed for why school performance, namely grades, had such a strong influence on the emergence of early sexual activity for girls. It is possible that evidence of academic difficulties may be coupled with grade retention, which would mean an age discrepancy from peers. This age discrepancy could create both social and biological maturational discrepancies in terms of "earlier" pubertal development (than same-grade peers). Both biological and social maturational discrepancies may place girls at a unique disadvantage for early sexual activity. There may be increased attention received by older male peers, a desire to "fit it" and therefore increased socialization with older peers, or a combination of both that may increase the risk of affiliation with older peers and engagement in early sexual activity. It is also quite possible that early academic difficulties may alienate young girls from their peers in school, which might lead them to seek out alternative social networks. It is likely that these alternative social networks may be

comprised of other children who are alienated from normative social groups, and a higher likelihood therefore of association with deviant male children (Dishion, et al, 1995), increasing the probability of early sexual affiliations.

As a caveat, while academic functioning provided unique and significant predictive information for girls, it should also be noted that the same processes (e.g., poor verbal skills, neurodevelopmental delay) have been posited to be underlying causal factors to both aggression and academic problems (Hinshaw, 1992). Numerous studies have demonstrated that academic functioning, particularly poor grades, serve not only as markers of risk, but serve as transactional processes which affect trajectories over time (Lewin, Davis, & Hops, 1999; O'Neil, Welsh, Parke, Wang, & Strand, 1997). Understanding the additive effects is just one step in elucidating developmental patterns; future research should point towards examining the complex relationships along their developmental course. Furthermore, only two specific markers of child adaptation were examined in this study. Emerging research regarding early sexual activity provides evidence that various contextual factors such as parent-child relationship quality, father absence, and mother's educational level serve to predict and explain why young girls are beginning to enter sexual relationships at young ages (McBride, Paikoff, & Holmbeck, 2003; Woodward & Fergusson, 1999). The relationship between behavioral characteristics, individual markers of adaptation, and larger contextual factors is complex. Further research is necessary to highlight and provide clarity regarding the role of not only the individual behavioral and adaptational variables highlighted in this study, but the *relationships among* these variables to larger contextual factors. Given that early sexual activity is associated with a myriad of life-changing and life-threatening outcomes including teen

pregnancy and HIV+ infection, this further research is critical to begin to dismantle the trajectories leading to early sexual activity among girls.

### A Closer Examination of Aggression and Associated Disruptive Behaviors Within and Between Gender

The second major goal of this study was an evaluation of models of conduct problem development for girls in relation to boys given the existence of an interesting “gender paradox” described by Silverthorn & Frick (1999). That is, while more boys than girls show aggression in the early school years, this gender gap narrows considerably by early adolescence, when nearly equal numbers of boys and girls demonstrate antisocial activities. Based upon this “gender paradox”, questions have been raised regarding the extent to which early aggression predicts risk for antisocial outcomes among girls (Silverthorn & Frick; Zahn-Waxler, 1993). However, other researchers have suggested that when aggression is evident in girls, it is just as predictive of negative outcomes as for their male counterparts (Cairns et al., 1989; McFayden-Ketchum et al., 1996). Even so, the emergence of a significant proportion of girls with antisocial behavior in early adolescence who did not evidence earlier aggression has raised questions about the possibility of an alternative delayed-onset trajectory to antisocial behavior among girls – one that is not accounted for by early problematic behavior.

In the present study, which included a large sample of boys and girls showing high levels of disruptive behavior at school entry, more boys than girls exhibited a constellation of aggressive-dysregulated behaviors in kindergarten. This fits the well-established research base that the aggressive-dysregulated constellation of behavior characteristic of the typical early-

starting profile occurs more frequently in boys than in girls (Keenan & Shaw, 1997; Zoccolillo, 1993). Conversely, more girls than boys were characterized in kindergarten by a constellation of dysregulated behaviors (hyperactive, oppositional, inattentive) that did not include concurrent aggression, consistent with research demonstrating that gender differences are less marked for nonaggressive disruptive behaviors than for aggression (Crick, 1997; Pulkinnen & Pitkanen, 1993; Webster-Stratton, 1996).

A person-oriented perspective on the data also revealed considerable gender similarity in the predictability of early antisocial activity from grade school profiles of aggressive-dysregulated and (nonaggressive) dysregulated behavior problems. That is, when the outcomes of children who showed a kindergarten profile of aggressive-dysregulated behavior were examined, nearly *equal* rates of boys and girls who showed this profile went on to engage in antisocial activity. The significance of these findings are important as they provide information to answer a key question of this study --e.g., that similar patterns of behavior place boys and girls who show early aggression at near equal risk for later antisocial behavior. Similarly, rates of antisocial activity in adolescence were fairly similar for boys and girls who showed early profiles of nonaggressive-dysregulated behavior problems.

Follow-back comparisons examining the histories of boys and girls who became antisocial suggested that the apparent “gender paradox” that has been described may reflect gender base-rate differences in the prevalence of early aggression, rather than a differential predictive course associated with early aggression for girls and boys. That is, follow-back comparisons, in which the early behavior problems of girls and boys who became antisocial

were contrasted, revealed that a greater proportion of the boys who became antisocial fit an early aggressive-spectrum profile, compared to the girls who became antisocial.

Follow-back analyses also revealed that in turn, more girls than boys who endorsed antisocial behavior in 7<sup>th</sup> grade were marked by kindergarten nonaggressive-dysregulated profiles. Results from this study support the hypothesis that nonaggressive dysregulated vulnerabilities work in similar ways to aggressive-dysregulated vulnerabilities (hallmark of the early-starting model for boys) to predict and explain the emergence of adolescent conduct problems. It has been suggested that due to base rate differences, early aggression may not function well to identify most at-risk girls (Robins, 1986; Zahn-Waxler, 1993; Zoccolillo, 1993), but indeed, when both aggression and other dysregulated behaviors are considered, a majority (over 70%) of the girls who become antisocial show early signs of disruptive behavioral development.

This study demonstrates that for girls, similar to early-starting boys, when aggression is apparent in the early school years it sets a stage for later antisocial problems in early adolescence. Perhaps more importantly, findings demonstrate that the risk of aggression is heightened when it occurs within a spectrum of multi-problem aggressive-dysregulated behavior. Among boys, the well-established “early-starting” model strongly supports the necessity of early intervention to reduce the risk of life-course persistent antisocial behavior that is costly to individuals and society (CPPRG, 1992), and given the established negative outcomes for girls with adolescent conduct problems, researchers have recently begun to consider what early determinants may serve as targets for prevention and intervention efforts for girls (Chesney-Lind & Brown, 1999; Woodward & Fergusson, 1999). Results of this study

suggest that for girls, early determinants are the same as for boys, and early prevention/intervention efforts should focus their attention on a spectrum of aggressive and dysregulated behavior in order to capture girls who follow a similar early-starting path towards adolescent conduct problems.

However, rates of aggression in girls are disproportionately smaller than for boys, suggesting that while predictive, using aggressive behaviors alone will only identify a small number of girls at risk. A broader focus on dysregulated behavior, as well as aggressive behavior, may increase screening accuracy, as a third of the girls who developed later antisocial problems exhibited dysregulated but not aggressive behaviors at school entry.

In addition, the finding of pronounced base rate differences in aggression for aggressive boys and girls at school entry suggests a necessary area for further examination. Gender equality in rates of aggression in the toddler years, yet disproportionate rates for boys by school entry suggests that the preschool socialization period deserves special attention in terms of explaining why girls' aggression is more effectively socialized during this developmental period than is boys' aggression. Some have theorized that socialization agents impinge upon the rates of aggression, as expression of aggression in girls is less tolerated than for boys (Keenan & Shaw, 1997; Zahn-Waxler, 1993). Understanding the ways in which socialization processes may particularly influence aggressive behaviors at this point in development may be essential to understanding gender differences in the path of early problematic behavior to later antisocial activity.

#### Relationships Among Negative Outcomes

Finally, a third goal of this study was to explore the occurrence of, and relationship among, antisocial activity, substance use, and sexual activity for both girls and boys. In this sample of high-risk adolescents, girls and boys reported the initiation of substance use at similar rates. In terms of initiation of antisocial and sexual activity, boys showed significantly higher base-rates of than did girls.

Given the relatively high rates of early adolescent problems in this sample, it was possible to examine relations between engagement in antisocial activity and the likelihood that youth would engage in other risky behaviors (substance use or sexual activity). It is notable that, when these risky behaviors occurred alone (e.g. without either of the other risky behaviors), antisocial activity was most likely to occur in isolation for both boys and girls, and sexual activity was least likely to occur in isolation. Similar to past research, these proportions suggest that antisocial behavior is often the first risky behavior initiated by young adolescents, and may provide entry into a peer group or “life style” context in which opportunities and reinforcement for substance use and sexual activity increase (Elliot, Huizinga, & Ageton, 1985; Jessor, 1992). Overall, for both boys and girls, conditional probability of engagement in other risky activities given antisocial behavior was significant, suggesting that when examining the emergence and occurrence of early adolescent conduct problems, consideration of other high-risk behaviors will add valuable information (Bingham & Crockett, 1996). As a caveat, while these findings provide consequential information regarding the probable risk of co-occurrence of these outcomes, a longitudinal assessment would be necessary in order to precisely examine the timing of problem emergence over the course of adolescence (Costello et al., 1999).

### Limitations and Future Directions

Data from this study adds important information to understanding the development of antisocial behavior, but several limitations to the generalizability of these findings exist. First, we were interested in the *early* emergence of antisocial and related risky adolescent activities. While our findings provide important information about children at this developmental time-point, conclusions regarding general patterns of later adolescent behavior will require additional studies with older adolescents. In particular, research regarding the *growth* of problematic behavior may shed more light on gender similarities and differences in risk trajectories. Furthermore, longitudinal studies that follow girls into adulthood will establish similar tests in regards to early behaviors, adolescent conduct, and adult outcome.

Second, our measures of antisocial behavior and substance use applied a dichotomous rating of engagement, which did not allow for tests of *severity* of outcome and the potential different impact that may have on predictive utility of risk trajectories. For example, past research has suggested whereas male and female rates of alcohol consumption are quite similar, males report a much higher rate than females of “harder drugs” such as PCP and LSD (Snyder & Sickmund, 1995). Future research should consider the question of severity of behavior and its relation to risk trajectories.

Third, due to the sampling strategy (e.g., the use of a high-risk sample), the base rate self-reported problem outcomes were above national averages (CDC; 1996). That is, as opposed to epidemiological studies resulting in population-based normative averages, participants in this study were chosen to reflect the highest 10% of the sampling population in terms of their problem behavior ratings. An advantage of the current sample was that it

included a sufficient number of high-risk girls to examine the developmental consequences of different problem profiles, but given the high-risk nature of the sample, it does not represent population base rates. Furthermore, while the kindergarten behaviors examined in this study are best understood within a continuum, follow-back analyses required dichotomization of scores to reflect “yes” or “no” to elevated risk, and there is no standard guideline to direct how to delineate dichotomized risk. Given the focus on identification of risk factors for prevention, a fairly broad cutoff of .75 was chosen in order to include a wider range of children with sub-clinical yet elevated behavior problems in kindergarten. This broad screen was considered important to maintain a sample of children with behavior problems *within* this already high-risk sample. That is, due to the nature of the high-risk sample – e.g., children were selected because of behavior problems at school-entry, a more liberal cut-off would allow for a larger screen of the role of problematic behaviors. Future research is necessary to assess the generalizability of these findings to normative populations.

Finally, while the sample size was generous for the person-profile analyses, the relatively small sample size did not allow for multivariate examination of contextual factors such as race, timing of puberty, etc. Family, school, culture, and neighborhood ecology have all been shown to contribute in different ways to the emergence of adolescent conduct problems (Rutter, 2003). In this initial examination of individual behavioral characteristics associated with the early and delayed onset models of risk, the percentages of variance accounted for in our models, while significant, was small. Consideration of contextual factors should occur in future assessments regarding models of risk with girls.

## References

- Achenbach, T. M. (1991). Integrative guide for the 1991 CBCL/4-18, YSR, and TRF profiles. Burlington, VT: University of Vermont Department of Psychiatry.
- Achenbach, T. M., Howell, C., T., McConaughy, S. H., Stanger, C. (1995). Six-year predictors of problems in a national sample of children and youth: II. Signs of disturbance. Journal of the American Academy of Child and Adolescent Psychiatry, *34*, 488-498.
- Aiken, L. S., & West, S. G. (1991). Multiple regression: Testing and interpreting interactions. (Newbury Park, CA: Sage).
- American Psychological Association (1994). Diagnostic and Statistical Manual of Mental Disorders, 4th Edition (DSM-IV). Washington, DC: American Psychological Association.
- Archer, J., & Westerman, K. (1981). Sex differences in the aggressive behavior of schoolchildren. British Journal of Social Psychology, *20*, 31-36.
- Archer, J., Pearson, N. A., & Westerman, K. E. (1988). Aggressive behavior of children aged 6-11: Gender differences in their magnitude. British Journal of Social Psychology, *27*, 371-384.
- Arnold, L. E. (1996). Sex differences in ADHD: Conference summary. Journal of Abnormal Child Psychology, *24*, 555-569.
- August, G. J., Braswell, L., & Thuras, P. (1998). Diagnostic stability of ADHD in a community sample of school-aged children screened for disruptive behavior. Journal of Abnormal Child Psychology, *26*, 345-356.
- Bagwell, C. L., Newcomb, A. F., & Bukowski, W. M. (1998). Preadolescent friendship and peer rejection as predictors of adult adjustment. Child Development, *69*, 140-153.
- Bardone, A. M., Moffitt, T. E., Caspi, A., Dickson, N. & Silva, P. A. (1996). Adult mental health and social outcomes of adolescent girls with depression and conduct disorder. Development and Psychopathology, *8*, 811-829.
- Barkley, R. A. (1982). Specific guidelines for defining hyperactivity in children (Attention-Deficit Disorder with Hyperactivity). In B. Lahey & A. Kazdin (Eds.). Advances in Clinical Child Psychology, *5*, pp.137-180. New York: Plenum Press.
- Baron, R. M., & Kenny, D. A. (1986). The moderator-mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. Journal of Personality and Social Psychology, *51*, 1173-1182.
- Benenson, J. F. (1990). Gender differences in social networks. Journal of Early Adolescence, *10*, 472-495.
- Biederman, J., Faraone, S. V., Mick, E., Williamson, S., Wilens, T. E., Spencer, T. J., Weber, W., Jetton, J., Kraus, I., Pert, J., & Ballen, B. (1999). Clinical correlates of ADHD in females: Findings from a large group of girls ascertained from pediatric and psychiatric referral sources. Journal of the American Academy of Child and Adolescent Psychiatry, *38*, 966-975.
- Bierman, K. L., Domitrovitch, C. & Fang, G. Y. (2003). Patterns of disruptive behaviors in girls and boys and their developmental consequences. Unpublished Manuscript.
- Bierman, K. L., Smoot, D. L., & Aumiller, K. (1993). Characteristics of aggressive-rejected, aggressive (nonrejected) and rejected (nonaggressive) boys. Child Development, *64*, 139-151.

Bjorkqvist, K., Lagerspetz, K. M., & Kaukiainen, A. (1992). Do girls manipulate and boys fight? Developmental trends in regard to direct and indirect aggression. Aggressive Behavior, 18, 117-127.

Brennan, P. A., Hall, J., Bor, W., Najman, J. M., & Williams, G. (2003). Integrating biological and social processes in relation to early-onset persistent aggression in boys and girls. Developmental Psychology, 39, 309-323.

Broidy, L. M., Nagin, D. S., Tremblay, R. E., Bates, J. E., Brame, B., Dodge, K. A., Fergusson, D., Horwood, J. L., Loeber, R., Laird, R., Lynam, D. R., Moffit, T. E., Pettit, G. S., & Vitaro, F. (2003). Developmental trajectories of childhood disruptive behaviors and adolescent delinquency: A six cite, cross-national study. Developmental Psychology, 39, 222-245.

Budnick, K. J., & Shields-Fletcher, E. (September, 1988). What about girls? Bulletin. Washington, DC: U.S. Department of Justice, Office of Justice Programs, OJJDP.

Cairns, R. B., & Cairns, B. D. (1984). Predicting aggressive patterns in girls and boys: A developmental study. Aggressive Behavior, 10, 227-242.

Cairns, R. B., Cairns, B. D., Neckerman, H. J., Ferguson, L. L., & Garipey, J. L. (1989). Growth and aggression: 1. Childhood to early adolescence. Developmental Psychology, 25, 320-330.

Calhoun, G., Jurgens, J., & Chen, F. (1993). The neophyte female delinquent: A review of the literature. Adolescence, 28, 461-471.

Caplan, M., Vespo, J., Pederson, J., & Hay, D. F. (1991). Conflict and its resolution in small groups of one- and two-year olds. Child Development, 62, 1513-1524.

Carlson, C. L., Tamm, L., & Gaub, M. (1997). Gender differences in children with ADHD, ODD, and co-occurring ADHD/ODD identified in a school population. Journal of the American Academy of Child and Adolescent Psychiatry, 36, 1706-1714.

Cicchetti, D. (1984). The emergence of developmental psychopathology. Child Development, 55, 1-7.

Cirino, R. J. & Beck, S. J. (1991). Social informational processing and the effects of reputational, situational, developmental, and gender factors among children's sociometric groups. Merill-Palmer Quarterly, 37, 561-582.

Chesney-Lind, M., & Brown, M. (1999). Girls and violence: An overview. In D.J. Flannery & C.R. Huff (Eds.), Youth violence: Prevention, intervention, and social policy (pp. 171-199). Washington, D.C.: American Psychiatric Press.

Cillessen, A. H. N., van Ijzendoorn, H. W., van Lieshout, C. F. M., & Hartup. W. W. (1992) Heterogeneity among peer-rejected boys: Subtype and stabilities. Child Development, 63, 893-905.

Coie, J. D. & Dodge, K. A. (1983). Continuities and changes in childrens' social status: A five-year longitudinal study. Child Development, 59, 815-829.

Coie, J.D., Lochman, J.E., Terry, R., & Hyman, C. (1992). Predicting early adolescent disorder from childhood aggression and peer rejection. Journal of Consulting and Clinical Psychology, 60, 783-792.

Coie, J., Terry, R., Lenox, K., Lochman, J., & Hyman, C. (1995). Childhood peer rejection and aggression as predictors of stable patterns of adolescent disorder. Development and Psychopathology, 7, 697-713.

Coie, J. D., Watt, N. F., West, S. G., Hawkins, J. D., Asarnow, J. R., Markman, H. J., Ramey, S. L., Shure, M. B., & Long, B. (1993). The science of prevention: A conceptual framework and some directions for a national research program. American Psychologist, *48*, 1013-1022.

Conduct Problems Prevention Research Group (1992). A developmental and clinical model for the prevention of conduct disorder: The FAST Track program. Development and Psychopathology, *4*, 509-527.

Craig, W. M. (1998). The relationship among bullying victimization, depression, anxiety, and aggression in elementary school children. Personality and Individual Differences, *24*, 123-130.

Crick, N. R. (1997). Engagement in gender normative versus nonnormative forms of aggression: Links to social-psychological adjustment. Developmental Psychology, *33*, 610-617.

Crick, N. R., & Grotpeter, J. K. (1995). Relational aggression, gender, and social-psychological adjustment. Child Development, *66*, 710-722.

Cummings, E. M., Ionnotti, R. J., & Zahn-Waxler, C. (1989). Aggression between peers in early childhood: Individual continuity and developmental change. Child Development, *69*, 887-895.

Deater-Deckard, K., Dodge, K. A., Bates, J. E., Pettit, G. S. (1998). Multiple risk factors in the development of externalizing behavior problems: Group and individual differences. Development and Psychopathology, *10*, 469-493.

DeRosier, M. E., Kupersmidt, J. B., & Patterson, C. J. (1994). Children's academic and behavioral adjustment as a function of the chronicity and proximity of peer rejection. Child Development, *1994*, 1799-1813.

Dishion, T. J; French, D.C, & Patterson, G.R. (1995). The development and ecology of antisocial behavior. In Cicchetti, D. & Cohen, D. J. (Eds). Developmental psychopathology, Vol. 2: Risk, disorder, and adaptation. Wiley series on personality processes. (pp. 421-471). New York, NY, USA: John Wiley & Sons.

Dishion, T. J., Patterson, G. R., & Griesler, P.C. (1994). Peer adaptations in the development of antisocial behavior: A confluence model. In Huesmann, L. R. (Ed). Aggressive behavior: Current perspectives. Plenum series in social/clinical psychology. (pp. 61-95). New York, NY, USA: Plenum Press.

Eley, T. C., Lichtenstein, P., & Stevenson, J. (1999). Sex differences in the etiology of aggressive and nonaggressive antisocial behavior: Results from two twin studies. Child Development, *70*, 155-168.

Elliot, D. S., Ageton, S. S., & Huizinga, D. (1985). Explaining delinquency and drug use. Beverly Hills: Siegal.

Fergusson, D. M., & Horwood, L. J. (1996). The role of adolescent peer affiliations in the continuity between childhood behavioral adjustment and juvenile offending. Journal of Abnormal Child Psychology, *24*, 205-221.

Fergusson, D. M. & Lynskey, M. T. (1998). Conduct problems in childhood and psychosocial outcomes in young adulthood. Child Abuse & Neglect, *21*, 617-630.

French, D. C. (1990). Heterogeneity of peer-rejected girls. Child Development, *61*, 2028-2031.

Gaub, M., & Carlson, C. L. (1997). Gender differences in ADHD: A meta-analysis and critical review. Journal of the American Academy of Child and Adolescent Psychiatry, *36*, 1036-1045.

George, T. P., & Hartmann, D. P. (1996). Friendship networks of unpopular, average, and popular children. Child Development, *67*, 2301-2316.

Girls Incorporated (1996). Prevention and parity: Girls in juvenile justice. Indianapolis: Girls Incorporated National Resource Center.

Golombok, S. & Fivush, R. (1994). Gender Development. New York: Cambridge University Press.

Greenberg, M. T., & Speltz, M. L. (1988). Contributions of attachment theory to the understanding of conduct problems during the preschool years. In J. Belsky & T. Negworski (Eds), Clinical Implications of Attachment (pp 17-218). Hillsdale, NJ: Erlbaum.

Gresham, F. M., MacMillan, D. L., Bocian, K. M., Ward, S. L., & Forness, S. R. (1998). Comorbidity of hyperactivity-impulsivity-inattention and conduct problems: Risk factors in social, affective, and academic domains. Journal of Abnormal Child Development, *26*, 393-406.

Hartung, C. M. & Widiger, T. A. (1998). Gender differences in the diagnosis of mental disorders: Conclusions and controversies of the DSM-IV. Psychological Bulletin, *123*, 260-278.

Hartup, W. W. (1989). Social relationships and their developmental significance. American Psychologist, *44*, 120-126.

Harvey, S. M., & Spingner, C. (1995). Factors associated with sexual behavior among adolescents: A multi-variable analysis. Adolescence, *30*, 253-262.

Heitjan, D.F. (1997). Annotation: What can be done about missing data? Approaches to imputation. American Journal of Public Health, *87* (4), 548-550.

Hinshaw, S. P. (1992a). Academic underachievement, attention deficits, and aggression: Comorbidity and implications for intervention. Journal of Consulting and Clinical Psychology, *60*, 893-903.

Hinshaw, S. P. (1992b). Externalizing behavior problems and academic underachievement in childhood and adolescence: Causal relationships and underlying mechanisms. Psychological Bulletin, *111*, 127-155.

Hodges, E. V., Boivin, M., Vitaro, F., & Bukowski, W. M. (1999). The power of friendship: Protection against an escalating cycle of peer victimization. Developmental Psychology, *35*, 94-101.

Hymel, S., & Franke, S. (1985). Children's peer relations: Assessing self-perceptions. In B. H. Schneider, K. H. Rubin, & J. E. Ledingham (Eds.), Children's peer relations: Issues in assessment and intervention (pp. 75-91). New York: Springer-Verlag.

Jaccard, J. (2001). Interaction Effects in Logistic Regression. Sage University Paper Series on Quantitative Applications in the Social Sciences, 135. Thousand Oaks, CA: Sage.

Jessor, R. (1992). Risk behavior in adolescence: A psychosocial framework for understanding and action. Developmental Review, *12*, 374-390.

Keenan, K., & Shaw, D. (1997). Developmental and social influences on young girls' early problem behavior. Psychological Bulletin, *121*, 95-113.

Kupersmidt, J. B., & Coie, J. D. (1990). Preadolescent peer status, aggression, and

school adjustment as predictors of externalizing problems in adolescence. Child Development, *61*, 1350-1362.

Kupersmidt, J. B., & Patterson, C. J. (1991). Childhood peer rejection, aggression, withdrawal, and perceived competence as predictors of self-reported behavior problems in preadolescence. Journal of Abnormal Child Psychology, *19*, 427-449.

Ladd, G. W., Kochenderfer, B. J., & Coleman, C. C. (1997). Classroom peer acceptance, friendship, and victimization: Distinct relational systems that contribute uniquely to children's school adjustment? Child Development, *68*, 1181-1197.

Ladd, G. W., & Mize, J. (1983). A cognitive-social learning model of social skill training. Psychological Review, *90*, 121-157.

Lagerspetz, K. M., Bjorkvist, K., & Peitonin, T. (1988). Is indirect aggression typical of females? Gender differences in aggressiveness in 11- to 12-year-old children. Aggressive Behavior, *14*, 403-414.

Lahey, B. B., McBurnett, K., & Loeber, R. (1999). Are attention-deficit hyperactivity disorder and oppositional defiant disorder developmental precursors to conduct disorder? In M. Lewis & A. Sameroff (Eds.), Handbook of developmental psychopathology, Vol. 2. New York: Plenum Press.

Lahey, B. B., Waldman, I. D., & McBurnett, K. (1999). Annotation: The development of antisocial behavior: An integrative causal model. Journal of Child Psychology and Psychiatry, *40*, 669-682.

Leadbeater, B. J., Kuperminc, G. P., Hertzog, C., & Blatt, S. J. (1999). A multivariate model of gender differences in adolescents' internalizing and externalizing problems. Developmental Psychology, *35*, 1268-1282.

Lewin, L. M., Davis, B., & Hops, H. (1999). Childhood social predictors of adolescent antisocial behavior: Gender differences in predictive accuracy and efficacy. Journal of Abnormal Psychology, *27*, 277-292.

Loeber, R. (1982). The stability of antisocial and delinquent child behavior: A review. Child Development, *53*, 1431-1446.

Loeber, R. & Dishion, T. (1983). Early predictors of male delinquency: A review. Psychological Bulletin, *94*, 68-99.

Loeber, R. & Schmalting, K. B. (1984). The utility of differentiating between mixed and pure forms of antisocial child behavior. Journal of Abnormal Child Psychology, *13*, 315-336.

Loeber, R., Wung, P., Keenan, K., Giroux, B., Stouthamer-Loeber, M., VanKammen, W. B., & Maughan, B. (1993). Developmental pathways in disruptive child behavior. Development and Psychopathology, *5*, 103-133.

Lyons, J., Serbin, L. A., & Marchessault, K. (1989). The social behavior of peer-identified aggressive, withdrawn, and aggressive/withdrawn children. Journal of Abnormal Child Psychology, *16*, 539-552.

Maccoby, E. A. (1990). Gender and Relationships: A developmental account. American Psychologist, *45*, 513-520.

Mackesy-Amiti, M. E., Fendrich, M., & Goldstein, P. J. (1997). Sequence of drug use among serious drug users: Typical vs atypical progression. Drug & Alcohol Dependence, *45*, 185-196.

Masse, L. C. & Tremblay, R. E. (1999). Kindergarten disruptive behavior, family

adversity, gender, and elementary school failure. International Journal of Behavioral Development, *23*, 225-240.

Maumary-Gremoud A. (2001). Self-Reported Delinquency. Technical Report, FAST Track, Durham, NC.

McBride, C. K., Paikoff, R. L., & Holmbeck, G. N. (2003). Individual and familial influences on the onset of sexual intercourse among urban African American adolescents. Journal of Consulting and Clinical Psychology, *71*, 159-167.

Menard, S. (1995). Applied Logistic Regression Analyses. Sage University Paper Series on Quantitative Applications in the Social Sciences, 106. Thousand Oaks, CA: Sage.

McFayden-Ketchum, S., A., & Bates, J. E. (1996). Patterns of change in early childhood aggressive-disruptive behavior: Gender differences in predictions from early coercive and affectionate mother-child interactions. Child Development, *67*, 2417-2433.

Miller-Johnson, S., Coie, J. D., Maumary-Gremaud, A., Lochman, J., & Terry, R. (1999). Relationship between childhood peer rejection and aggression and adolescent delinquency severity and type among African American youth. Journal of Emotional and Behavioral Disorders, *7*, 137-146.

Moffitt, T. E. (1990). Juvenile delinquency and attention-deficit disorder: Developmental trajectories from age three to fifteen. Child Development, *61*, 893-910.

Moffitt, T. E. (1993). The neuropsychology of conduct disorder. Development and Psychopathology, *5*, 135-152.

Moffitt, T. E., Caspi, A., Belsky, J., & Silva, P. (1992). Childhood experience and the onset of menarche: A test of a sociobiological model. Child Development, *63*, 47-58.

Nagin, D. & Tremblay, R. E. (1999). Trajectories of boys' physical aggression, opposition, and hyperactivity on the path to physically violent and nonviolent juvenile delinquency. Child Development, *70*, 1181-1196.

Newcomb, M. D., Maddahian, E., Skager, R., & Bentler, P. M. (1987). Substance use and psychosocial risk factors among teenagers: Associations with sex, age, ethnicity, and type of school. American Journal of Drug and Alcohol Abuse, *13*, 413-433.

O'Neil, R., Welsh, M., Parke, R. D., Wang, S., & Strand, C. (1997). A longitudinal assessment of the academic correlates of early peer acceptance and rejection. Journal of Clinical Child Psychology, *26*, 290-303.

Parker, J. G., & Asher, S. R. (1987). Peer relations and later personal adjustment: Are low-accepted children at risk? Psychological Bulletin, *102*, 357-389.

Patterson, G. R. (1982). Coercive family processes. Eugene, OR: Castalia.

Patterson, G. R., DeBaryshe, B. D., & Ramsey (1989). A developmental perspective on antisocial behavior. American Psychologist, *64*, 329-335.

Patterson, G. R., & Stouthamer-Loeber, M. (1984). The correlation of family management practices and delinquency. Child Development, *55*, 1299-1307.

Pope, A. W. & Bierman, K. L. (1999). Predicting adolescent peer problems and antisocial activities: The relative roles of aggression and dysregulation. Developmental Psychology, *35*, 335-346.

Price, J. M. & Dodge, K. A. (1989). Peer's contributions to children's social maladjustment: Description and intervention. In T. J. Berndt & G. W. Ladd (Eds.), Peer Relationships in Child Development, (pp. 341-370). New York: Wiley.

Pulkkinen, L., & Pitkanen, T. (1993). Continuities in aggressive behavior from childhood to adulthood. Aggressive Behavior, *19*, 249-263.

Robins, L. N. (1986). The consequences of conduct disorder in girls. In D. Olweus, J. Block, & M. Radke-Yarrow (Eds.). Development of antisocial and prosocial behavior (pp. 385-414). NY: Academic Press.

Rubin, K. H., Chen, X., & Hymel, S. (1993). Socioemotional characteristics of withdrawn and aggressive children. Merrill-Palmer Quarterly, *39*, 518-534.

Rutter, M. (2003). Commentary: Causal processes leading to antisocial behavior. Developmental Psychology, *39*, 372-378.

Rutter, M. (1989). Pathways from childhood to adult life. Journal of Child Psychology and Psychiatry, *30*, 23-51.

Sandler, A. D., Hooper, S. R., Watson, T. E., & Coleman, W. L. (1993). Talkative children: Verbal fluency as a marker for problematic peer relationships in clinic-referred children with attention deficits. Perceptual and Motor Skills, *76*, 943-951.

Schwartz, D., McFayden-Ketchum, S., Dodge, K. A., Pettit, G. S., & Bates, J. E. (1999). Early behavior problems as a predictor of later peer group victimization: Moderators and mediators in the pathways of social risk. Journal of Abnormal Psychology, *27*, 191-201.

Serbin, L. A., Marchessault, K., McAffer, V., Peters, P., & Schwartzman, A. E. (1993). Patterns of social behavior on the playground in 9- to 11-year old girls and boys: Relation to teacher perceptions and to peer ratings of aggression, withdrawal, and likability. In Hart, C. H. et al (Eds), Children on playgrounds: Research prospectives and applications. SUNY series, children's play in society. (Pp.162-183). Albany, NY, USA: State University of New York Press.

Sharp, W. S., Walter, J. M., Marsh, W. L., Ritchie, G. F., Hamburger, S. D., & Castellanos, F. X. (1999). ADHD in girls: Clinical comparability of a research sample. Journal of the American Academy of Child and Adolescent Psychiatry, *38*, 40-47.

Shaw, D. S., Keenan, K. & Vondra, J. J. (1994). Developmental precursors of externalizing behavior: Ages 1 to 3. Developmental Psychology, *30*, 355-364.

Shaw, D. S., Owens, E. B., Vondra, J. J., Keenan, K., & Winslow, E. B. (1997). Early risk factors and pathways in the development of early disruptive behavior problems. Development and Psychopathology, *8*, 679-700.

Silverthorn, P. & Frick, P. J. (1999). Developmental pathways to antisocial behavior: The delayed-onset pathway in girls. Development and Psychopathology, *11*, 101-126.

Snyder, H. N., & Sickmund, M. (1995). Juvenile offenders and victims: A national report. Washington, DC: Office for Juvenile Justice and Delinquency Prevention.

Sroufe, L. A., & Rutter, M. (1984). The domain of developmental psychopathology. Child Development, *55*, 17-29.

Starfield, B., Rile, A.W., Green, B. F., & Ensminger, M. E. (1995). The Adolescent Child Health and Illness Profile: A population-based measure of health. Medical Care, *33*, 553-566.

Stattin, H. & Magnusson, D. (1989). The role of early aggressive behavior in the frequency, seriousness, and types of later crime. Journal of Consulting and Clinical Psychology, *57*, 710-718.

Stormshak, E. A., Bierman, K. L., & CPPRG (1998). The implications of different

developmental patterns of disruptive behavior problems for school adjustment. Development and Psychopathology,

Tatem-Kelley, B., Loeber, R., Keenan, K. & DeLamatre, M. (December, 1997). Developmental pathways in boys' disruptive and delinquent behavior. Juvenile Justice Bulletin. Washington, D.C.: Office of Juvenile Justice and Delinquency Prevention.

Taylor, E., Chadwick, O., Heptinstall, E., & Danckaerts, M. (1996). Hyperactivity and conduct problems as risk factors for adolescent development. Journal of the American Academy of Child and Adolescent Psychiatry, 35, 1213-1226.

Thornberry, T. P & Krohn, M. D. (1997). Peers, drug use, and delinquency. In Stoff, D. M., & Breiling, J. (Eds). Handbook of antisocial behavior. (pp. 218-233). New York, NY, USA: John Wiley & Sons, Inc.

Tremblay, R. A., LeBlanc, M., & Schwartzman, A. E. (1988). The predictive power of first-grade peer and teacher ratings of behavior: Sex differences in antisocial behavior and personality at adolescence. Journal of Abnormal Child Psychiatry, 16, 571-583.

Vaughn, S., Hogan, A., Lancelotta, G., Shapiro, S., & Walker, J. (1992). Subgroups of children with mild and severe behavior problems: Social competence and reading achievement. Journal of Clinical Child Psychology, 21, 98-106.

Verhulst, F. C., & ver der Ende, J. (1991). Four-year follow-up of teacher reported problem behaviors. Psychological Medicine, 21, 965-977.

Vitaro, F., Tremblay, R. E., Gagnon, C., & Boivin, M. (1992). Peer rejection from kindergarten to grade 2: Outcomes, correlates, and prediction. Merrill-Palmer Quarterly, 38, 382-400.

Volling, B. L., Mackinnon-Lewis, C., Rabiner, D., & Baradaran, L. P. (1993). Children's social competence and sociometric status: Further exploration of aggression, social withdrawal, and peer rejection. Development and Psychopathology, 5, 459-483.

Wangby, M., Bergman, L. R., & Magnusson, D. (1999). Development of adjustment problems in girls: What syndromes emerge? Child Development, *70*, 678-699.

Webster-Stratton, C. (1996). Early-onset conduct problems: Does gender make a difference? Journal of Consulting and Clinical Psychology, *64*, 540-551.

Weiler, J. (1999). Choices Briefs: An overview of research on girls and violence. New York: Institute for Urban and Minority Education, Teachers College, Columbia University.

Wenz-Gross, M. & Siperstein, G. N. (1998). Students with learning problems at risk in middle school: Stress, social support, and adjustment. Exceptional Children, *65*, 91-100.

Whalen, C. K., & Henker, B. (1980). Hyperactive children: The social ecology of identification and treatment. New York: Academic Press.

White, J., Moffitt, T. E., Caspi, A., Jeglum-Bartush, D., Needles, D., & Stouthamer-Loeber, M. (1994). Measuring impulsivity and examining its relation to delinquency. Journal of Abnormal Psychology, *103*, 192-205.

Woodward, L. J. & Fergusson, D. M. (1999). Early conduct problems and later risk of teenage pregnancy in girls. Development and Psychopathology, *11*, 127-141.

Zabin, L. S. & Hayward, S. C. (1993). Adolescent Sexual Behavior and Childbearing. Newbury Park, CA: Sage.

Zahn-Waxler, C. (1993). Warriors and worriers: Gender and psychopathology. Development and Psychopathology, *5*, 79-91.

Zahn-Waxler, C., Iannotti, R. J., Cummings, E. M., & Denham, S. (1990). Antecedents of problem behavior in children of depressed mothers. Development and Psychopathology, *2*, 271-291.

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- 1992           **B.S. in Psychology: With Distinction** - Pennsylvania State University

### PROFESSIONAL EXPERIENCE

- 2001 – present           Research Scientist Committee for Children.
- 2001-2002           Research/Clinical Fellow University of Washington School of Medicine  
                  - Dept of Psychiatry and Behavioral Sciences.
- 2000-2001           Psychology Resident University of Washington School of Medicine -  
                  Dept of Psychiatry and Behavioral Sciences.
- 1998–2000           Data Analyst FAST Track Program.
- 1999 - 2000           Clinical Supervisor Pennsylvania State University.
- 1991-1998           Project Director FAST Track Program.

### Selected Publications and Presentations

Bruschi, C. (2003). Fitting universal prevention programs within established school curricula. Paper presented at the annual meeting of the National Prevention Network, Albuquerque, New Mexico, 2003.

Bruschi, C. (2003). Developmental implications for violence prevention: Meeting the social-emotional learning needs of preschoolers. Paper presented at the annual meeting of Society for Prevention Research, Washington, D.C., June, 2003.

Bierman, K. L., Bruschi, C. J., Domitrovitch, C., Fang, G., Miller-Johnson, S & CPPRG. (2002). Early disruptive behaviors associated with emerging antisocial behavior among girls. Paper presented at the Duke Series on Child Development and Child Policy, Durham, N.C, May, 2002.

Cole, P. M., Bruschi, C. J., & Tamang, B. L. (2002). Cultural differences in children's emotional reactions to difficult situations. Child Development, 73, 983-996.

Trupin, E., Richards, H., & Bruschi, C. (2001). An outcome evaluation of the King County Mental Health Court. Washington State Dept. of Social Services, Seattle, WA.

Stormshak, E. A., Bierman, K. L., Bruschi, C.J., Dodge, K., Coie, J., & CPPRG (1999). The relation between behavior problems and peer preference in different classroom contexts. Child Development, 70, 169-182.

Bruschi, C. J., Cole, P.M., & Tamang, B.L. (1999). Cultural variation in children's display rules: anger and shame. Poster presented at the biennial meeting of Society for Research in Child Development, Albuquerque, New Mexico, April, 1999.

Allison, K. A., Burton, L., Bruschi, C. J., Fhagen-Smith, P., Perez-Febles, A. (1998). Intergenerational patterns of stress in the families of urban African-American adolescent mothers. Poster presented at the Biennial meeting of the Society for Research in Adolescence, San Diego, CA. February, 1998.

Bruschi, C. J., Bierman, K.L., Schwartz, L., Smoot, D., O'Brien, S (1996). Treatment Factors Associated with Positive Outcomes in a Social Skills Training Program for Aggressive-Rejected Boys. Poster presented at the annual meeting of the Association for the Advancement of Behavior Therapy, NY, NY. November, 1996.