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Predicting Delinquency in Adolescence and Young Adulthood: A Longitudinal Analysis of Risk and Protective Factors

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Predicting Delinquency in Adolescence and Young Adulthood:
A Longitudinal Analysis of Risk and Protective Factors

By

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A thesis submitted in partial fulfillment
of the requirements for the degree of
Master of Arts
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Predicting Delinquency in Adolescence and Young Adulthood:

A Longitudinal Analysis of Risk and Protective Factors

Amy E. Green

ABSTRACT

Longitudinal studies that track individuals from childhood into adulthood may be the best method to identify risk and protective factors for crime and delinquency. The primary goals of this study were to determine 1) the ability of risk factors identified by the end of elementary school to predict delinquency referrals, 2) the extent to which positive assets (promotive factors) add to the prediction of delinquency, and 3) potential interactions between these risk and promotive factors that moderate the relationship between risk and delinquency referrals. The final purpose was to identify gender and racial differences in these relationships. The current study utilized archival data from a large metropolitan Florida school district which tracked students who began kindergarten in the 1989-90 school year for as long as they remained in the district.

After controlling for gender, race, and SES, fifth grade teacher rated externalizing behaviors, prenatal smoking, parent marital status, and mother's years of education significantly predicted delinquency referrals. The biological factors birth weight and Apgar score were not related to delinquency referrals in correlation or regression models. Additionally, the combination of the nine potential promotive factors was found to contribute to a significant increase in variance above that accounted for by the three

control factors and nine risk factors. The most consistently supported promotive factor was parental acceptance/involvement. Although no interaction effects were found in the overall model, when analyzed by gender, two significant interactions were found for females. These interactions were between parents' marital status and parental acceptance involvement as well as third grade standardized reading scores and parent educational involvement. Findings suggest that, even when using a stringent test of significance, risk factors assessed between birth and the end of elementary school can be used to predict the number of subsequent delinquency referrals.

In conclusion, results from this study not only identify and confirm early risk factors for later delinquency involvement, but also implicate potential positive assets that may buffer the impact of early risk factors. These findings can inform early intervention programs aimed at reducing rates of juvenile delinquency, by identifying criteria for early identification as well as components of effective prevention/intervention.

Introduction

Although its frequency has decreased in recent years, juvenile delinquency remains a serious problem in the United States with 2.3 million arrests made each year to persons under the age of 18 (Office of Juvenile Justice and Delinquency Prevention, 2004). Efforts to decrease the number of delinquent acts have led researchers to investigate the underlying factors that may help to prevent the onset of delinquency. Empirically designed and supported early intervention programs are the best method to decrease rates of delinquency. The identification of early risk and protective factors are imperative to the success of these programs. Longitudinal studies that track individuals from childhood into adulthood have been the preferred method to identify risk and protective factors (Garnezy, Masten, & Tellegen, 1983; Gutman, Sameroff, & Cole, 2003; Luthar, 2006; Masten & Coatsworth, 1998; Werner, 1993). Additionally these longitudinal studies help to uncover pathways to resilience whereby individuals are able to achieve successful outcomes despite the presence of adversity. The current study uses a longitudinal data set to identify early risk factors, positive assets (promotive factors), and moderators (protective factors) that contribute to delinquency outcomes.

Risk Factors

Risk factors can be identified as being either within the individual, family, or the broader environment. Risk factors can be identified as specific to a particular outcome such as high school dropout or delinquency, or less specifically for placing an individual

at risk for generally negative outcomes. Examples of frequently documented risk factors include poverty, living in a dangerous neighborhood, neglect, abuse, parental violence, parental substance abuse, depression or stress in the family, physical illness or disability, homelessness or frequent relocation, parental death, birth-related factors, inadequate nutrition, large family size, lack of social skills, early aggressive behavior, low reading levels, and unstable family environment (Ladd & Troop-Gordon, 2003; Lipman, Bennett, Racine, Mazumdar, & Offord, 1998; McLoyd, 1998; Reinherz, Giaconia, Hauf, Wasserman, & Paradis, 2000; Werner, 1993).

The issue of how to measure risk has become a recent focus of risk and resilience research. Cumulative or multiple risk models of development state that children's developmental outcomes are better predicted by combinations of risk factors than by individual factors alone. Researchers have suggested that maladaptive outcomes are not as strongly related to any one particular risk factor as they are to the number of risk factors in a child's life (Rutter, 1979; Sameroff, 1998). Additionally, findings indicate that children often survive exposure to single risk factors, although the effects of multiple risks significantly increases the risk of maladaptive outcomes (Rutter, 1979; Sameroff, 1998). Illustratively, in the Isle of Wight study, Rutter investigated the impact of six risk factors including severe marital distress, low SES, large family size or overcrowding, paternal criminality, maternal psychiatric disorder, and admission of the child to foster care on psychiatric illness (Rutter, 1979). Although no single risk factor significantly increased risk for the presence of a psychiatric disorder, the presence of two risk factors was associated with a 5% increase, and having four or more risk factors was associated with a 21% increase in children's psychiatric diagnosis.

Another set of studies also found that the presence of multiple risk factors leads to increasingly maladaptive outcomes including mental illness, problem behaviors, and academic problems (Gutman, Sameroff, & Cole, 2003; Gutman, Sameroff, & Eccles, 2002; Sameroff, 1998). In the Rochester Longitudinal Study, the researchers created a multiple-risk index that included ten risk factors consisting mainly of detrimental family characteristics. The presence or absence of each risk factor was calculated, and each individual was assigned a cumulative risk score ranging from zero to ten. The researchers found that the total number of risk factors predicted outcomes such as children's IQ and social-emotional competence better than any single risk factor alone (Gutman et al., 2003). Results also found that children with eight or more risk factors were almost seven times more likely to have poor academic outcomes than those with zero to three risk factors (Sameroff, 1998).

Promotive/Protective factors

Although the process of identifying risk factors is imperative to understanding subsequent outcomes in youth, it fails to account for intervening positive factors and processes that may be influential in predicting outcomes (Garmezy et al. 1993; Luthar, 2006; Werner, 1993). Past studies have conceptualized the mechanisms by which these positive factors work in different ways. These positive assets may reduce problem behaviors either directly (promotive) or by moderating (protective) the effect of risk factors. Promotive factors differ from protective factors in that they function to promote competence not only in high-risk populations but also in low risk populations. These factors that exhibit a main effect in reducing problem behavior have also been labeled *compensatory factors* (Fergusson & Horwood, 2003). *Protective factors*, by comparison,

serve to moderate the relationship between risk factors and outcomes, thereby buffering the impact of risk on the negative outcome.

Like risk factors, promotive/protective factors are often conceptualized as assets occurring within the three domains of the individual, family, and environment. Examples of promotive/protective factors include intelligence, problem solving skills, academic competence, emotion regulation, self-efficacy, social competence, family warmth, strong social support, external interests and affiliations, high quality education environment, safe neighborhoods, and presence of positive adult role models (Garmezy et al., 1984; Gutman et al., 2003; Masten & Coatsworth, 1998; Werner, 1993). The presence or absence of promotive/protective factors such as these affects the trajectories and outcomes of individuals identified as being at risk. Specific resilience pathways rely on an interaction between risk factors and promotive/protective factors. By recognizing links between risk factors, promotive/protective factors, and outcomes, researchers may more successfully identify targets for intervention and prevention (Coie et al., 1993).

Understanding Resilience

Much of resilience research has evolved from the study of developmental risk. Although risk factor research assists in the identification of individuals at increased risk for maladaptive outcomes, it fails to explain how problems develop. Therefore, research has recently turned to the study of processes, including the interactions of risk and protective factors, which account for maladaptive and adaptive outcomes. One of the earliest examples of resilience research is Werner and Smith's longitudinal study of a birth cohort of Hawaiians from the island of Kauai in 1955 (Werner, 1993). The purpose of the investigation was originally to document the cohort's life course from birth to age

forty, exploring outcomes associated with prenatal trauma, poverty, parental psychopathology, and other adverse conditions. The Kauai study focused mainly on the effects of risk factors but discovered that a number of individuals were able to overcome early adversity and lead adaptive lives. Specifically, the study found that many of the high-risk children who developed into healthy, competent adults despite having adverse histories were likely to report the presence of protective factors, such as strong bonds with a non-parent care-giver and involvement in communities groups. As a result, the Kauai study's purpose shifted from a primary focus on risk factors, to studying the process of resilience.

Another early example of resilience research was Norman Garmezy's "Project Competence" which identified children at risk for schizophrenia, indicated by having a parent diagnosed with schizophrenia (Garmezy, 1971). Garmezy found that although these children were at increased risk for developing schizophrenia, almost ninety percent had normal developmental outcomes. Garmezy next examined factors which contributed to successful outcomes despite a biological risk for schizophrenia, giving rise to his "Project Competence" and the field of resilience research.

Garmezy's founding work on "Project Competence" has been continued under the direction of Ann Masten and colleagues (Masten, Burt, & Coatsworth, 2006; Masten & Hubbard, 1999). Extensive information was gathered about the lives of these 205 high risk children, including information about their competence, the adversity they faced throughout their lives, and factors that might have made a difference in their lives. From these studies, researchers have learned that children who succeeded in the face of adversity had more internal and external resources, most notably, high intelligence and

effective parenting. They were also involved in activities at home, school, and in their communities. In contrast to these resilient youth, children who did not fare well in the face of adversity faced the same challenges with very few protective resources.

The construct of resilience itself has been the source of definitional debate, as is often the case in a newly emerging field or research paradigm (Luthar et al., 2000). Early investigations of resilience often stated explicitly or implied that certain individuals were invincible or invulnerable (Garmezy, 1971). However, these terms are inaccurate because they imply an absolute resistance to damage. Rutter explains that since individuals do not possess absolute resistance, it is more appropriate to consider susceptibility to stress as a graded phenomenon (Rutter, 1987). For example, despite succeeding at major developmental tasks or outcomes, these individuals often have less severe or obvious problems including internalizing problems as a result of the early risk.

An additional problem with the concept of invulnerability is the implication that resilience is an intrinsic feature of an individual. This perception of resilience as a trait is misleading, as research findings indicate that resilience results not only from individual strengths, but also from interactions of an individual and his or her environment.

Although early models of resilience often viewed it as a trait or an outcome, more recent views conceptualize resilience the *process* by which an individual is able to achieve competence despite adversity (Masten et al., 1999; Masten, 2001). This definition implies that, in order for resilience to occur, there needs to be a significant threat to the individual, often conceptualized as either high-risk status or exposure to trauma.

Individuals who behave or adjust in a competent or successful manner after exposure to risk factors or trauma are said to be resilient. However, operationally defining this level

of competence has also been a recent source of debate in resilience research. One of the more common conceptualizations of competence describes success as meeting age-appropriate developmental expectations of a given society (Luthar, 1993; Masten et al., 1998). Other researchers have defined competence as domain specific based on the absence or low levels of maladaptive outcomes such as psychopathology, substance use, academic failure, and delinquency (Costa, Jessor, & Turbin, 1999; Gutman et al., 2002; Grizenko & Fisher, 1992; Hawkins, Catalano, & Miller, 1992; Tremblay et al., 1992).

Longitudinal Studies

Although cross-sectional studies provide a vast amount of data concerning most psychological constructs, this method does not best capture a developmental process such as resilience (Loeber & Farrington, 1994). Despite their substantial cost in time and resources, prospective longitudinal research designs are often necessary when studying resilience due to their ability to track changes over time and reveal developmental pathways to positive and negative outcomes. Further, there are several other potential advantages of using a prospective longitudinal study design in this line of research. These include the ability to develop temporal patterns to assist in the inference of causality, the identification of specific timing in regards to onset and offset of risks and delinquency, and the reduction of recall bias in the assessment of risk factors in cases where risk factors are assessed prior to the onset of delinquency (Farrington, 1991; Verhulst & Koot, 1991).

Individual Versus Variable Centered Studies

Risk and protective factors have generally been studied together using either an individual-based or a variable-based paradigm (Magnusson & Bergman, 2004). The

individual-based model involves targeting a high-risk group and determining factors that predict success and failure among those individuals. These high-risk individuals are usually identified based on the presence or absence of a specific risk factor.

Alternatively, the demonstrated effect(s) of multiple risks has led to the use of a cumulative risk index to determine risk groups, usually based on distribution cutoff scores, to identify individuals at varying levels of risk (Luthar, 2006; Werner, 1993).

Analyses then seek to identify factors that differentiate successful children from other groups. Although this method may be less costly and time consuming than the variable based approach, decisions must be made to determine cutoffs for continuous risk factor data and risk group membership. Also, the aggregation of risk can obscure the relative importance of individual risk factors as well as specific links that may clarify or define the resilience process (Masten, 2001).

Although more costly and time consuming, the variable-focused approach often maximizes statistical power and has been described as the best method for determining specific links between predictors and outcomes (Magnusson et al., 2004; Masten, 2001). This approach typically requires surveying a larger group of individuals for the presence of various risk and promotive/protective factors using statistical methods such as multiple regression to determine the most relevant risk and promotive/protective factors in the population. Unlike the individual centered approach, this method allows researchers to more easily determine the relative importance of individual risk and protective factors. In addition, this approach allows the researcher to explore specific interaction or moderator effects that may occur.

Juvenile Delinquency Prevention

According to data from the Florida Department of Juvenile Justice, 95,263 juveniles were referred for delinquency between 2004 and 2005 (Florida Department of Juvenile Justice, 2006). Delinquency prevention plays an important role in the Florida Department of Juvenile Justice's efforts to reduce juvenile crime through early identification and targeted interventions of youth most at risk of becoming delinquent. Researchers have identified risk factors that are predictive of increased probabilities of subsequent delinquency and substance use (Hawkins et al., 1992; Loeber & Farrington, 2000; Stouthamer-Loeber, Loeber, Wei, Farrington, & Wikstrom, 2002). The level and amount of exposure to risk factors are hypothesized to lead youths on a pathway to involvement in problem behaviors (Gutman et al., 2003). Common risk factors include favorable attitudes toward problem behaviors, antisocial peer group affiliation, disadvantaged neighborhood location, low bonding to school, and academic failure (Elliot, Wilson, Huizinga, & Sampson, 1996; Hawkins et al., 1992; Herrenkohl et al., 2000; O'Donnell, Hawkins, & Abbott, 1995; Nagin & Tremblay, 2001).

Although much research has been conducted on risk factors for delinquency (Brennan, Grekin, & Mednick, 1999; Brier, 1995; Conseur, Rivara, Barnoski, & Emanuel, 1997; Fergusson & Horwood, 1995; Tremblay et al., 1992), there has been little research on promotive and protective factors in juvenile delinquency, virtually all of it within the past ten years (Stouthamer-Loeber et al., 2002; Yoshikawa, 1994). Luthar has emphasized a need for that assessment of resilience to occur across multiple spheres of adjustment (Luthar, 1993). Specifically, although many studies focus on protective factors for overall social competence, there is a need to study protective factors involved

in resiliency across multiple domains, including specific behavioral or life outcomes. The identification of factors that appear to protect individuals from involvement in delinquent behaviors is crucial to the design and implementation of prevention and intervention programs.

Yoshikawa (1994) reviewed multidisciplinary research on the early risk factors for chronic delinquency from disciplines of criminology, developmental psychology, psychopathology, and early intervention. Risk factors for delinquency included poverty, lack of bonding to school and community, low intelligence, affiliation with deviant peers, availability of drugs and guns, genetic predispositions, biological factors, and family factors. Research on early intervention programs was also reviewed revealing that effective intervention programs involve both high quality early childhood services that protect children from risk factors and family support services that provide parents with information on parenting skills and other services. Yoshikawa concludes that both early childhood education services and family support service may be necessary to reduce the negative effects of multiple risk and subsequently reduce delinquency.

Risk Factors for Juvenile Delinquency

Race and socioeconomic status. Race and socioeconomic status have been implicated as risk factors in most studies of delinquency (Farrington & Loeber, 2000; Jessor, 1993; McLoyd, 1998; Yoshikawa, 1994). This link has been so well documented that many researchers have focused their investigations and interventions for delinquency on low-income African-American adolescents who have higher prevalence rates of delinquency than other racial and socioeconomic groups (Costa et al., 1999; Seidman et al., 1998; Tremblay, Pagani-Kurtz, Masse, Vitaro, & Pihl, 1995). Other researchers have

pointed out that socioeconomic status is a distal risk factor whose effects are mediated by proximal risk factors (Yates, Egeland, & Sroufe, 2003). Such proximal factors include parenting behaviors, family structure, community variables, and the child's social network. This conclusion was based on findings that race and socioeconomic status are correlated with many other risk factors for delinquency, including large family size, single parent households, family discord, perinatal complications, parental substance abuse, and low levels of parental education (Linver, Brooks-Gunn, & Kohen, 2002; Yoshikawa, 1994).

Gender. The overall referral rate for delinquency for males is in many cases three times that of females, although this gap has been narrowing in recent years (Loeber et al., 2000; Mullis, 2004). In Florida, 28,660 females were referred to the department for delinquency in 2004-2005, accounting for one-third of total juveniles referred for delinquency (Florida Department of Juvenile Justice, 2006). In addition to the differential rates of referral for males and females, different pathways to delinquency and behavioral problems have also been suggested for males and females (Blum, Ireland, & Blum, 2003; Cote, Tremblay, Nagin, Zoccolillo, & Vitaro, 2002; Tremblay et al., 1992). A recent review of the literature on female juvenile offending found that arrests of females have been increasing at a higher rate than for males, although females were typically involved in less violent and less serious offenses (Mullis, 2004). Females have also been found to have an earlier onset of delinquent behaviors with a less chronic pattern of offending, labeled as "early onset adolescent limited offending trajectory" (Fergusson & Horwood, 2002). Other reviews of the literature have suggested that there are gender specific risk and protective factors that interact in creating different pathways

to delinquency for males and females (Loeber & Stouthamer-Loeber, 1998; O'Donnell, et al., 1995). This suggestion points to the need for studies to first determine whether significant differences do exist between the two sexes in models of pathways to delinquency and to then proceed, if warranted, with separate analyses of risk and protective variables for males and female. These possible differences have yet to be fully developed because many of the large scale studies of pathways to delinquency have focused solely on high risk male samples (Stouthamer-Loeber et al., 2000; O'Donnell et al., 1995).

Birth related factors. Various risk factors measured at birth have been associated with behavioral difficulties and delinquency. These factors have included biological variables such as low birth weight and Apgar scores, prenatal substance use, and maternal characteristics including mother's age, mother's education level, and mother's marital status (Brennan, Grekin, Mortensen, & Mednick, 2002; Fergusson, Horwood, & Lynskey, 1993; Gibson & Tibbetts, 1998; McCormick, Workman-Daniels, & Brooks-Gunn, 1996).

Gibson and his colleagues have conducted a series of analyses on the influence of birth related risk factors on juvenile offending using a longitudinal data set from the Philadelphia portion of the Collaborative Perinatal Project that consists of 832 inner-city, African-American youths (Gibson & Tibbetts, 2000; Gibson & Tibbetts, 1998). Results from these studies have found that maternal cigarette smoking (one or more cigarettes per day) combined with low Apgar scores (less than seven) and maternal cigarette use combined with the absence of a father were significant predictors of offending behavior.

The detrimental effects of prenatal tobacco use have also been documented as a single significant risk factor for predicting later maladaptive behavioral and psychological outcomes (Brennan et al., 2002; Brennan et al., 1999; Fergusson, et al., 1993; Fergusson, Woodward, & Horwood, 1998). Using a birth cohort of 4,129 males, maternal smoking during the third trimester was related to increased rates in criminal behaviors in adult offspring up to age 34, even after controlling for SES, birth complications, maternal age, maternal rejection, paternal criminology, and paternal psychopathology (Brennan et al., 1999).

Low birth weight has been associated with a variety of negative outcomes, most notably academic problems (Conseur et al., 1997; McCormick et al., 1996; Rickards, Kelly, Doyle, & Callanan, 2001). One recent study attempted to explore not only the relationship between low birth weight and academic problems, but also emotional and behavioral problems (Rickards et al., 2001). Very low birth weight children (N=130) born between 1980 and 1982 were compared with normal birth weight children (N=42) at the age of fourteen. Assessment results found that very low birth weight children scored at a significantly lower level on all three composite scales of the Wechsler Intelligence Scale for Children-3rd Edition, were more likely to be rated by teachers as socially rejected and by their parents as having learning problems at school, had lower levels of self-esteem, and had greater levels of problem behaviors at age fourteen when compared to the normal birth weight control subjects. However, a number of more recent investigations of the detrimental effects of low birth weight have found that these children may not be as vulnerable as previously believed (Gardner et al., 2004; Hack et al., 2004). These researchers have suggested that although some short-term negative

outcomes may result from low-birth weight status, the long-term behavioral outcomes of these children often mirror that of normal birth weight individuals.

Maternal characteristics including mother's age, mother's education level, and mother's marital status at child's birth have also been implicated in subsequent delinquency. One study connecting birth certificates to juvenile justice outcomes found that both sons and daughters of mothers who were teenagers at the child's birth or at her first birth, or who were born to unmarried mothers, had significantly increased risk for any juvenile offending and for being adjudicated for five or more crimes (Conseur et al., 1997). Studies have further indicated that adolescents in single-parent families are significantly more likely to be delinquent than their counterparts residing with two biological, married parents (Demuth & Brown, 2004).

Low achievement. Research has also explored the relationship between academic performance, often focusing on reading ability, and behavioral problems (Brier, 1995; Fergusson & Horwood, 1995; Lynam, Moffitt, & Stouthamer-Loeber, 1993; Stanton, Feehan, McGee, & Silva, 1990). Although the negative relationship between academic achievement and behavioral problems has been repeatedly demonstrated, explanations for this connection have varied. Some studies have found lower academic achievement and reading ability to be a direct risk factor for later conduct problems (Lynam, Moffitt et al., 1993; Stanton et al., 1990); although, others have found reading difficulties to act as a distal risk factor for behavioral problems, dependent on mediating risk factors for the relationship to hold (Fergusson & Horwood, 1995; Fergusson & Lynskey, 1997).

Tremblay et al. examined whether poor school achievement was associated with juvenile delinquency via a direct link to disruptive behaviors or because of an

independent causal factor (Tremblay et al., 1992). In a longitudinal study, 342 male and female children were assessed on self and peer reported disruptive behaviors during grade 1, academic achievement in mathematics and language in grades 1 and 4, and self-reported delinquency and delinquent personality at age 14. Results revealed different paths to delinquency for males and females. For males, but not females, a direct causal link was found between grade 1 disruptive behaviors and delinquent behavior at age 14. For males the associations found between poor school achievement in grade 4 and later delinquency was preceded by grade 1 disruptive behavior. For both males and females poor school achievement was a necessary component of the causal path between grade 1 disruptive behavior and delinquency personality. Those who were poor school achievers also tended to be at high risk for delinquent personality in adolescence regardless of whether or not they had early disruptive behaviors.

Early externalizing behaviors. Early problem behaviors including aggression and inattention have been cited collectively as one of the strongest predictors of subsequent antisocial behaviors (Bor, McGee, Fagan, 2004; Simonoff, Elander, Holmshaw, Pickles, Murray, Rutter, 2004). Aggressive children have been found to be at higher risk for a myriad of problems including substance abuse, violent crimes, depression, domestic violence, and abusive parenting abuse (Tremblay, Nagin, Seguin, Zoccolillo, Zelazo, Boivin, Perusse, Japel, 2004). In a longitudinal analysis of the effects of early risk factors on criminal behavior and antisocial personality development, the authors concluded that early conduct problems and hyperactivity had the most powerful and persistent effects on adult criminal behaviors, even when controlling for intervening risk factors (Simonoff et al., 2004).

Promotive/Protective Factors for Juvenile Delinquency

Personal characteristics. Individual attributes such as having an easy temperament, internal locus of control, and positive self-concept have been associated with more positive outcomes including higher levels of cognitive and social-emotional competence and lower levels of internalizing and externalizing behaviors among those at high risk (Rutter, 1987; Seifer, Sameroff, Baldwin, & Baldwin, 1992; Tschann, Kaiser, Chesney, Alkon, & Boyce, 1996). The protective potential of these personal characteristics has been demonstrated in studies by Werner and Masten, who suggest that these characteristics allow the individuals who possess them to elicit positive responses from caring others (Werner, 1993; Masten & Coatsworth, 1998). Although these studies have revealed the protective effect that positive personal characteristic can have on at-risk individuals, the focus of the studies was not specifically on delinquency and problem behaviors.

Student activity involvement. Having a special talent or hobby valued by society has been shown to be a protective factor for those at high risk (Masten & Hubbard, 1999a; Werner, 1993f). Student involvement in activities may also promote the development of prosocial competence in those at risk for behavioral problems and delinquency. The presence of two or more hobbies has been found to significantly discriminate between children who do and do not develop behavior problems (Grizenko & Pawliuk, 1994). Individuals with more hobbies may obtain increased prosocial skills from activity involvement, build friendships, develop competencies, and also engage in a positive activity that may leave less time for involvement in problem behaviors.

Parenting behaviors. Numerous positive parenting practices such as parental supervision, parental expectations, parental warmth, and parental educational involvement have been shown to have a positive effect among both high and low risk individuals (Steinberg, Elmen, & Mounts, 1989; Steinberg, Lamborn, Dornbusch, & Darling, 1992). For example, parental involvement had been shown to have a promotive effect for youth, although consistent discipline has been shown to have both promotive and protective effects (Gutman et al., 2003). Parental monitoring, supervision, and discipline may protect against involvement with delinquent peer groups by both encouraging self-restraint and reducing opportunities to engage in problem behaviors. Other variables such as those constituting an authoritative parenting style representing high levels of warmth and control and secure attachments may provide protective functions by creating parent-child emotional bonds that assist in overcoming risk (Brody, Dorsey, Forehand, & Armistead, 2002).

School bonding. Students bonded to their school are likely to report liking school, feeling motivated to achieve, and having high expectations for their future academic success. School bonding has been viewed as an important area in prevention because it has been linked to various developmental and adjustment outcomes (Maddox & Prinz, 2003). Students who have a positive orientation and commitment towards school are less likely to drop out of school and display problem behaviors (Bryant et al., 2003). Students' connection to their schools was examined as one of the variables in the National Longitudinal Study of Adolescent Health (Resnick et al., 1997). A cross-sectional examination of interview data from 12,118 adolescents in grades seven through twelve was conducted to identify risk and protective factors in the individual, family, and

school that were related to the following: emotional distress; suicidal thoughts and behaviors; violence; use of cigarettes, alcohol, and marijuana; early sexual behaviors; and pregnancy. Perceived school connectedness was found to be protective against every health risk behavior measure except history of pregnancy.

Student-teacher relationships. Past studies have found students' connections to their teachers and the presence of teacher support to be related to positive outcomes (Birch & Ladd, 1998; Bowen, 1998; Fallu & Janosz, 2003; Hamre & Pianta, 2001; Werner, 1993). Teachers often have the ability to influence their students beyond the traditional role of academic educator by providing behavioral, emotional, and social support. This relationship is likely to be related to more positive outcomes in students, especially among children who lack support from alternative sources including peers and parents. In one prospective longitudinal study of the influence of the quality of the student-teacher relationship on aggression, the authors found both promotive and protective effects (Hughes, Cavell, & Jackson, 1999). After controlling for levels of aggression at Time 1, both teacher and student reported quality of the student-teacher relationship were related to teacher reported aggressive behaviors at Time 2. A positive student-teacher relationship was of greatest benefit to children whose mothers reported rejecting parenting histories. A separate study revealed that the quality of early child-teacher relationship predicted subsequent academic and behavioral outcomes of students (Hamre & Pianta, 2001).

Omnibus Project

The current study follows up a longitudinal school district effort call the "Omnibus Project". Data from the Omnibus Project were recently used as the foundation

for a dissertation on the extent to which birth related risk factors and subsequent critical family events predicted school discipline referrals and juvenile delinquency referrals between kindergarten and grade 5, and between grades 6 and 8. (Harbor, 2000). This study also assessed the potential protective function of academic achievement and student activity involvement. Results indicated that after controlling for race and socioeconomic status, mother's age and prenatal tobacco use during pregnancy predicted school discipline referrals. Also, the presence of critical family events accounted for statistically significant additional variance in discipline referrals for females, and in arrests for males and females. Interactions between individual risk and protective factors and delinquent outcomes were tested in separate regression models. Significant interactions were found for academic achievement with prenatal tobacco use, academic achievement with Apgar scores, student activity involvement with critical family events, and student activity involvement with prenatal tobacco use for females only.

Current Study

The current study is an extension of this previous work. Although significant findings were reported in the previous study, outcome variable data were only available through the 8th grade, and results were modest in size. The current study examined juvenile justice system data from the time individuals entered the system up to the time they entered the adult system at age 18. These additional years represent a time period developmentally when youth are more likely to commit offenses. Additionally, the Harbor study focused primarily on birth-related risk factors, examining the effectiveness of only two potential positive factors or assets. The current study examined the effects of seven potential risk factors and nine potential promotive/protective factors. This

expansion allowed for the examination of additional promotive/protective variables including parental and school related factors using previously validated scales.

Hypotheses

Hypothesis 1: Specific birth-related factors (Apgar score, prenatal cigarette use and birth weight), maternal characteristics (mother's education, marital status), and individual characteristics (CTBS reading score, externalizing behaviors) will predict the number of DJJ referrals beyond variance accounted for by gender, race, and SES.

Hypothesis 2: Individual (easy temperament, internal locus of control, activity involvement), familial (parental strictness/supervision, parental psychological autonomy support, parental acceptance/involvement, parental education involvement), and environmental factors (connection to school, connection to teachers) will contribute to our model by explaining additional variance in the outcomes of number of DJJ referrals beyond gender, race, SES, and the set of risk factors.

Hypothesis 3: An interaction will be found between parental acceptance/involvement and marital status on the number of DJJ referrals.

Hypothesis 4: An interaction will be found between mother's education level and connection to teacher on the number of DJJ referrals.

Hypothesis 5: An interaction will be found between students' 3rd grade CTBS reading scores and parents' educational involvement on the number of DJJ referrals.

Hypothesis 6: An interaction will be found between 3rd grade reading scores and connection to school on the number of DJJ referrals.

Hypothesis 7: An interaction will be found between mother's prenatal tobacco use and student's activity involvement on the number of DJJ referrals.

Methods

Participants

Participants in this study consisted of students enrolled in Pinellas County Schools' Omnibus Project. As part of the Omnibus Project, Pinellas County Schools collected longitudinal data for 8,734 students who began school in the 1989-90 kindergarten class. This project was designed by district personnel to provide school board employees and other interested persons with comprehensive information about Pinellas County students. Each year a committee comprised of school personnel and university researchers identified areas of interest and selected specific questions to be included in the survey. Committee membership, variables assessed, and target respondent groups varied by year. Consistent with Pinellas County School policies at the time of data collection, passive consent methods were used whereby families were notified about the project, but only parents who did not wish for their child to participate in the study were asked to contact the district. No records were kept to indicate the percentage of parents who did not allow their child to participate in the Omnibus Project. However, rates of survey completion averaged 70% for students, 79% for teachers, and 58% for parents.

Students who remained in the district were followed through their 13 years of schooling with data collected each year from combinations of student surveys, parent surveys, and teacher surveys. In addition to Omnibus survey data, information from the

general student data file including grades, discipline referrals, and standardized achievement scores were added to the Omnibus Project database each year. Achievement scores are available from the second grade through graduation in 2002. Data have been used by Pinellas County Schools to provide feedback to school staff, plan programs, and have also been made available to university researchers.

Additionally, birth record information was obtained from the Pinellas County Health Department for those students who were born in Pinellas County and entered kindergarten as a part of this cohort. The initial participant pool for the current study consisted of students in the Omnibus Project with birth record data available ($n=4,432$). Other variables in the current study were derived from parent, teacher, and student surveys completed between kindergarten and the eighth grade. Although data were available through twelfth grade for those students who remained in the district, selection of variables was restricted to surveys completed between kindergarten and eighth grade. This was done primarily because the focus of the study was on the predictive power of early risk and promotive/protective factors. Differential response rates, missing data, and attrition between kindergarten and the eighth grade also contributed to a decrease in the final sample size. Only students who had data available on the seven selected risk variable were included in the risk regression analyses. Students who, in addition to having data on all seven risk factors, had complete data on the nine selected promotive/protective factors, were included in the promotive/protective regression analyses. Only data from Black and White participants were selected for analyses in this study because the number of Asians, Hispanics, and Native Americans were collectively less than 1% of the cohort.

Attrition

Due to the longitudinal nature of this study, attrition rates varied for each survey year (see Figure 1). Omitting students who were not classified as either Black or White reduced the starting sample of 4432 to 4392. Twenty-two students had a missing data point for one of the three birth-related variables, reducing the sample to 4370. A question regarding prenatal smoking was selected from the 1989 parent survey. However, 970 parents did not have data on this item, further reducing the sample to 3400. The addition of third grade standardized reading scores reduced the sample to 2536, and the addition of four items on a fifth grade teacher survey constituting an externalizing behavior variable left a final sample with all selected risk and control variables of 2078. This sample was used to compute regression analyses regarding risk factors for delinquency. Chi-square analyses comparing the 2078 students in the risk sample to the students in the initial sample who did not have available risk data, revealed the sample used in risk analyses to be less male [$\chi^2(1)=35.61$; $p<.001$], Black [$\chi^2(1)= 42.94$; $p<.001$], and impoverished [$\chi^2(1)= 91.96$; $p<.001$] than the initial sample that was excluded from the risk sample (See Table 1).

The addition of nine selected promotive/protective factors reduced the sample size further. Three variables were derived from the 1995-1996 student survey, which reduced the sample size to 1470. The inclusion of items indicating parent's involvement in the child's education in the 1996-1997 student survey reduced the sample to 1137. Finally, the inclusion of three parenting variables and a locus of control scale from the 1997-1998 student survey reduced the sample to 564. This reduced sample was used for

Figure 1: Sample Attrition

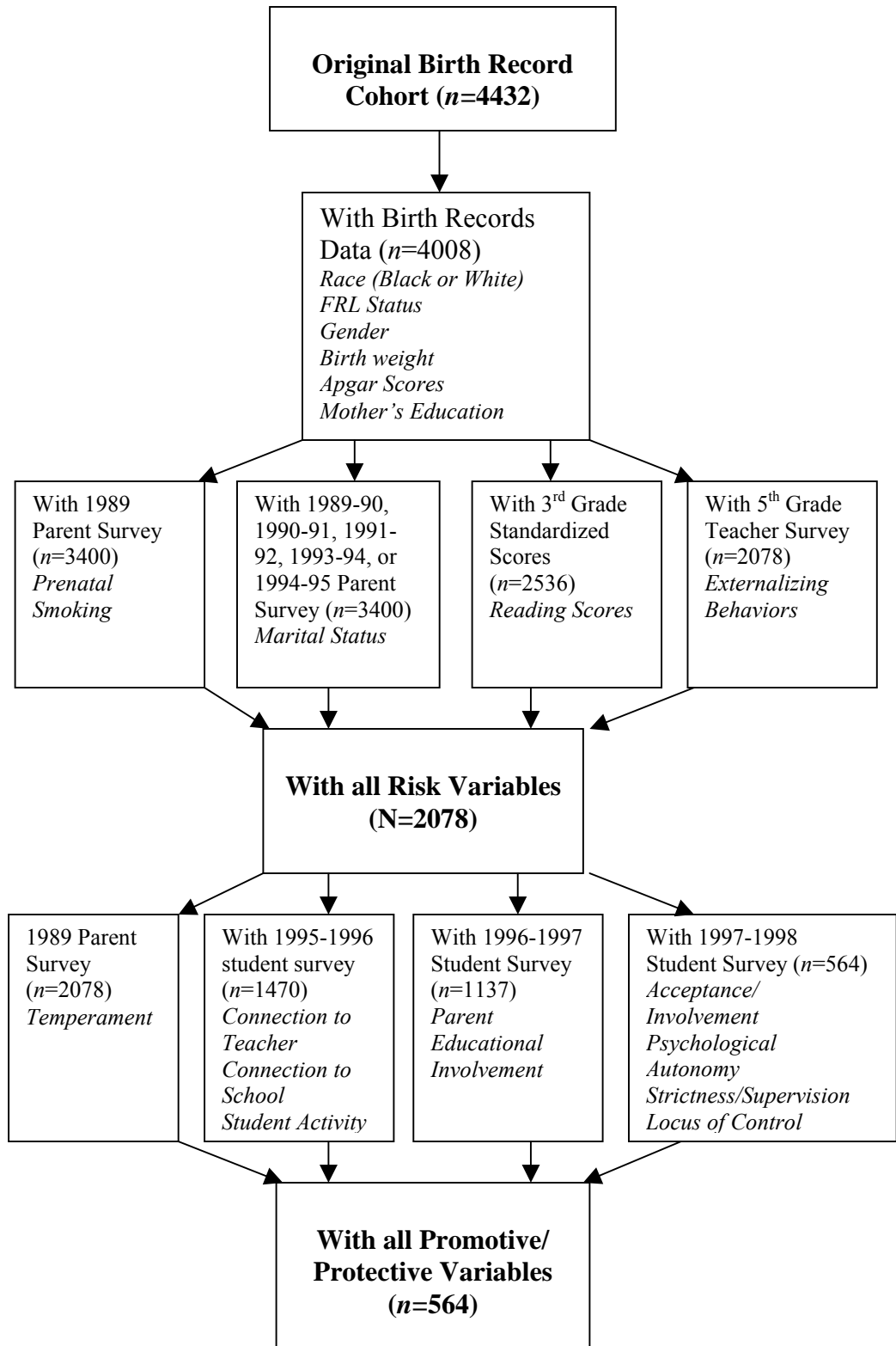


Table 1: Chi-square Analysis of Demographic Variables Comparing Birth Record and Risk Sample

		Gender		
		Female	Male	
Birth Sample w/o Risk Data		1009	1345	2354
Birth Sample w/ Risk Data		1077	1001	2078
Total		2086	2346	4432
		Race		
		White	Black	
Birth Sample w/o Risk Data		1599	715	2314
Birth Sample w/ Risk Data		1619	459	2078
Total		3218	1174	4392
		Lunch Status		
		No FRL	FRL	
Birth Sample w/o Risk Data		1007	923	1930
Birth Sample w/ Risk Data		1394	684	2078
Total		2401	1607	4008

promotive/protective factor regressions. Chi-square analyses revealed that the protective factor regression sample was less male [$\chi^2(1)=15.11;p<.001$], Black [$\chi^2(1)=46.99;p<.001$], and poor [$\chi^2(1)=65.98;p<.001$] than those in birth record sample who were not included in the promotive/protective sample and less Black [$\chi^2(1)=23.86;p<.001$] and poor [$\chi^2(1)=24.50;p<.001$] than those in the risk regression sample who were not included in the promotive/protective sample (See Tables 2 and 3).

Variable Inclusion

Some of the measures in the current study have undergone psychometric analyses and have good psychometric properties (Crandall, Katkovsky, & Crandal, 1965; Santa Lucia, 2004; Steinberg et al., 1989). However, most Omnibus surveys were developed with limited attention to psychometric properties and were based instead primarily on face validity.

Preliminary analyses were conducted to determine the best method to represent potential risk and promotive/protective factors, initially selected based on a review of risk and protective constructs supported in previous resilience literature. Data included in the analyses were derived from Omnibus surveys, school records, and birth records. Descriptive statistics were calculated for each variable to identify possible outliers due to coding errors. Risk and protective variables were examined for reliability (Cronbach's Alpha). Those variables with the highest internal reliability, while still maximizing the sample size for the study, were selected for subsequent analyses. Selected risk variables included: birth weight, Apgar scores, mother's education, prenatal smoking, marital status, reading scores, and externalizing behaviors. Using the same criteria, selected

Table 2: Chi-square Analysis of Demographic Variables Comparing Birth Record and Promotive/Protective Sample

	Gender		
	Female	Male	
Birth Record Sample w/ Promotive/Protective Data	309	255	564
Birth Record Sample w/o Promotive/Protective Data	1777	2091	3868
Total	2086	2346	4432
	Race		
	White	Black	
Birth Record Sample w Promotive/Protective Data	481	83	564
Birth Record Sample w/o Promotive/Protective Data	2737	1091	3828
Total	3218	1174	4392
	Lunch Status		
	No FRL	FRL	
Birth Record Sample w/ Promotive/Protective Data	426	138	564
Birth Record Sample w/o Promotive/Protective Data	1975	1469	3444
Total	2401	1607	4008

Table 3: Chi-square Analysis of Demographic Variables Comparing Risk and Promotive/Protective Sample

	Gender		
	Female	Male	
Risk sample w Promotive/Protective Data	309	255	564
Risk sample w/o Promotive/Protective Data	768	746	1514
Total	1077	1001	2078
	Race		
	White	Black	
Risk sample w/ Promotive/Protective Data	481	83	564
Risk sample w/o Promotive/Protective Data	1138	376	1514
Total	1619	459	2078
	Lunch Status		
	No FRL	FRL	
Risk sample w/ Promotive/Protective Data	426	138	564
Risk sample w/o Promotive/Protective Data	968	546	1514
Total	1394	684	2078

promotive/protective factors included: temperament, connection to school, connection to teachers, activity involvement, parental education involvement, parental acceptance/involvement, parental strictness/supervision, parental autonomy support, and locus of control. Table 4 presents the survey year and Chronbach's Alphas for the selected risk and promotive/protective factors (Chronbach's Alpha range= .56-.78). Appendix A contains survey items used to create the risk factor variables. Appendix B contains survey items used to create promotive/protective factors.

Control Variables

Race, gender, and socioeconomic status were utilized as control variables in this study because their relationships to maladaptive behavioral outcomes have been repeatedly demonstrated in previous studies (Brody et al., 2002; Brooks-Gunn & Duncan, 1997; Harbor, 2000; Leventhal & Brooks-Gunn, 2000; Linver et al., 2002; O' Donnell et al., 1995; Yeung, Linver, & Brooks-Gunn, 2002). The amount of variance accounted for in outcomes will be provided in Step 1 of the regression model, permitting the separate examination of additional risk factors beyond gender, socioeconomic status and race.

Race. The demographic variable of race was limited to Black and White students coded 0 for White and 1 for Black.

Gender. The demographic variable of gender was coded 0 for females and 1 for males.

Table 4: Thesis Variables, Alpha Coefficients, and Sources

Control Factor	Omnibus Variable	Survey Year
SES	Free/Reduced Lunch or Not Free/Reduced Lunch	1989 school records
Gender	Male or Female	Birth Records
Race	Black or White	Birth Records
Risk Factors	Omnibus Variable	Survey Year
Reading Scores	CTBS reading scores (continuous)	1992-1993 school records
APGAR score	Continuous data	Birth records
Birth weight (grams)	Continuous data	Birth records
Tobacco Use (prenatal)	½ pack or more per day or not	1989-1990 Parent Survey
Mother's Education	Continuous data birth records	Birth Records
Marital Status	Parent response other than married from birth to 5 th grade.	1989-1994 Parent Surveys
Externalizing Behaviors	Four items assessing externalizing behaviors; Alpha=.90	1994-1995 Teacher Survey
Promotive/Protective Factors	Omnibus Variable; Alpha	Survey Year
Easy temperament	Three child temperament questions; Alpha=.66	1989-1990 Parent Survey
Connection to School	Student Adjustment Survey; Alpha=.72	1995-1996 student survey
Connection to Teacher	Student Adjustment Survey; Alpha=.78	1995-1996 student survey
Activity Involvement	Student Involvement in Activities Scale; Alpha=.56	1995-1996 student survey
Parental Education Involvement	Seven school involvement questions; Alpha=.68	1996-1997 student survey
Parental Acceptance/Involvement	Steinberg Measure; Alpha=.71	1997-1998 student survey
Parental Psychological Autonomy	Steinberg Measure; Alpha=.72	1997-1998 student survey
Parental Strictness/Supervision	Steinberg Measure; Alpha=.71	1997-1998 student survey
Internal Locus of Control	Intellectual Achievement Responsibility Questionnaire; Alpha=.65	1997-1998 student survey
Outcome	Measure	Source
Number of referrals	Number of referrals made to DJJ for each student	DJJ records

Socioeconomic Status. SES was measured by eligibility for free or reduced lunch and was coded dichotomously for each participant with eligibility for free or reduced lunch coded as 1 and a code of 0 for those not eligible. Pinellas County Schools did not collect direct measures of income.

Risk Factors.

Birth weight. Birth weight information was gathered by the school district from the Pinellas County birth records. The data are presented in grams and were used as a continuous variable in the analyses.

Apgar score. Apgar score information taken after the first minute of birth is provided in the Pinellas County birth records. The Apgar score is a brief medical test performed at 1 and 5 minutes after birth to determine the physical condition of the newborn. Ratings are based on scores of 0, 1, or 2 on five categories including heart rate, respiratory effort, muscle tone, reflex irritability, and color: The final rating is based on a scale of 0 to 10. Eight to ten suggests the healthiest infants, and scores below 5 indicate that the infant needs immediate assistance in adjusting to his or her new environment (Medline Plus, 2002). A decision was made to use the one-minute Apgar score, which provided more subject data. The data were represented as a continuous variable in the analyses.

Prenatal tobacco use. Prenatal tobacco use was coded as an ordinal variable with respondents scores ranging from 0 (never smoked) to 7 (smoked 3 or more packs of cigarettes per day).

Mother's education level. Information on mother's education level was provided from Pinellas County birth record data and consists of the number of years of education reported.

Reading Achievement. The Comprehensive Test of Basic Skills, Fourth Edition (CTBS-4) was selected as the measure of reading achievement (CTB/McGraw-Hill, 1991). The CTBS-4 is a standardized achievement test designed for group or individual administration with students in grade levels K.0 to 12.9. Its purpose is to provide measurements of achievement in basic skills taught nationwide in the subject areas of language, reading, spelling, mathematics, study skills, social studies and science. Although multiple subscales are created for the CTBS-4, the reading subscale was selected as a risk factor based on previous findings that support low reading ability as a risk indicator for multiple negative outcomes (Loeber & Farrington, 2000). Items were selected for inclusion in the CTBS-4 based on Item Response Theory. Items with the best statistical quality with high content validity were selected for the final test. Third grade standardized reading scores were selected because past studies of early risk factors for juvenile delinquency have used similar measures of reading achievement at this grade (Fergusson et al., 1997; Loeber, Farrington, Stouthamer-Loeber, & Van Kammen, 1998; Maughan, Pickles, Hagell, Rutter, & Yule, 1996).

Marital Status. Previous studies have indicated that being born to an unmarried mother and having an unstable family environment are risk factors for delinquency (Demuth & Brown, 2004b). For the current study, this risk was represented as students who were either born to single mothers (identified by parent report on the 1989 survey) or whose parental marital status was identified as something other than married

(separated, divorced, widowed, remarried, single) when assessed in the 1990-1991, 1991-1992, 1992-1993, or 1994-1995 parent surveys. This variable is dichotomous and will be coded as 0 for the mother being married at all points of assessment and 1 for the mother reporting not being married at any point between birth and 1994-1995. This method of assessing family structure based on being born into a single-parent family or subsequent experience of parental separation was previously employed by others including Fergusson and colleagues in the Christchurch Health and Development Longitudinal Study (Fergusson et al., 2003).

Promotive/Protective Factors

Temperament. Three yes-no items from the 1989 kindergarten parent survey were combined based on their face validity to create a temperament scale representing an easy temperament ($\alpha=.66$). These items reflect key elements of an easy temperament including ability to get along with others, ease of parental management, and willingness to please others.

Activity Involvement. Student involvement in activities was assessed by responses from the 1995-1996 student survey. Students were surveyed regarding the number of hours each week they spent participating in each of five different categories of activities. Students answered each question as either 0 hours, 1-2 hours (coded as 1), 3-4 hours (coded as 2), 5-6 hours (coded as 3), or 7 or more hours (coded as 4). These scores were combined into a composite score ranging from a minimum of zero to a maximum of twenty ($\alpha=.56$).

Connection to School. Students' bonding to school was assessed using a six-item subscale of the Student Adjustment Survey administered to students in the 6th grade. The

School Adjustment Survey is a self-report scale consisting of 33 items assessing students' motivation, achievement expectations, connection to school, connection to teachers, connection to peers, and connection to parents. Items were rationally selected by Pinellas County Schools' personnel in accord with areas of interest to the district. Students were asked to state the degree to which they agreed with each of the 33 statements on a five-point scale ranging from (0) "Strongly Disagree" to (4) "Strongly Agree". Responses to the Student Adjustment Survey were factor analyzed and resulted in a five factor solution (Santa Lucia, 2004). The six item connection to school subscale was found to have an Alpha in the current study of .78.

Connection to Teachers. Students' connection to their teachers was assessed using a seven-item subscale of the Student Adjustment Survey administered to students in the 6th grade. The connection to teachers subscale was found to have an Alpha in the current study of .72 (Santa Lucia, 2004).

Although the majority of variables used in the current study were derived from items unique to the Omnibus Project, two standardized scales were also included.

The *Parenting Practices Survey* (Steinberg et al., 1989) is a 22-item scale which assesses student perceptions of parenting practices/style in their family. The three dimensions examined include psychological autonomy, strictness/supervision, and acceptance/involvement. Reliability and validity have been well established across multiple studies (Steinberg et al., 1987; Steinberg et al., 1989). Reported reliability statistics are alphas of .80, .72, and .76 respectively for parental psychological autonomy, strictness/supervision, and acceptance/involvement. Alphas for the current study were

.72, .71, and .71 respectively. Each subscale was used as an individual promotive /protective variable in the current study.

The *Intellectual Achievement Responsibilities Questionnaire* (IARQ) was administered to students in 1997-1998. The IARQ is a 34 item, forced-choice scale intended to measure students' locus of control that was constructed for use in educational settings (Crandall et al., 1965). Items describe either a negative or positive achievement experience and then present students with a dichotomized response option the event as being due to the child or due to someone or something else. The IARQ measures student beliefs in internal versus external reinforcement responsibility and yields (1) a total score and separate subscale scores for beliefs in internal responsibility for (2) successes and (3) failures. The total score was used in the analyses of this study. The IARQ was found to have moderately acceptable alpha coefficients with $\alpha=.65$ reported in both previous literature and the current study.

Outcome Variables

Juvenile Delinquency data were obtained from the Florida Department of Juvenile Justice (DJJ). Permission to access these records was granted in August 2004 from the DJJ's Institutional Review Board. Data from the DJJ was then matched to the Omnibus data file containing predictor variables. Because there is no national Department of Juvenile Justice database to determine whether Omnibus students had delinquency referrals in states other than Florida, a procedure was employed to determine which students were and were not likely to have discipline referrals in other states. In the Juvenile Delinquency system, discipline referrals are equivalent to arrests in the Adult Corrections system with adjudication determined at a later date. Students who did not

have a referral in the DJJ database were matched to Pinellas County School's enrollment records and Florida DMV records to determine whether the students were likely to have remained in Florida through their 18th birthday when they could no longer be referred by the DJJ. Fifty-eight students in the risk sample of 2078 did not have information listed in the FL DJJ database, Pinellas County School's twelfth grade student information system, or FL DMV's files. Due to the low number of students lacking this information and the low base rate of discipline referrals, a decision was made to include these students as having no contact with juvenile justice, or a score of zero for total number of delinquency referrals. Additionally, analyses run without these 58 students did not create significant difference in the results.

The data obtained from DJJ records included the total number of: (1) overall referrals, (2) misdemeanor referrals, (3) felony referrals, and (4) other referrals (primarily probation violations) for each student. Additionally, seriousness scores used by the DJJ including (1) the highest seriousness score across offenses and (2) the cumulative serious scores across offenses were also provided for each student. Seriousness scores were computed by the DJJ with individuals receiving 8 points for all violent or sexual felonies, 5 points for all other felony offenses, 2 points for misdemeanor assault/battery offenses, and 1 point for all other delinquency offenses.

Correlation analyses revealed high levels of multicollinearity among all of the DJJ outcome measures (See Table 5). Based on this finding, a decision was made to limit the outcome variable to total number of referrals for each student. Due to the low base rate of referrals in the overall sample, the distribution exhibited high levels of skewness and kurtosis (See Figures 2 and 3). A logarithmic transformation was performed on the

Table 5: Correlations of Outcomes

	1.	2.	3.	4.	5.	6.
1. All Referrals	1.00					
2. Highest Seriousness	.91**	1.00				
3. Total Seriousness Score	.80**	.69**	1.00			
4. Felony Referrals	.79**	.78**	.81**	1.00		
5. Misdemeanor Referrals	.95**	.80**	.73**	.62**	1.00	
6. Other Referrals	.76**	.76**	.57**	.48**	.75**	1.00

** Correlation is significant at the 0.01 level (2-tailed).

Figure 2: Bar Graph of the Total Number of Referrals per Student in the Risk Sample ($n=2078$)

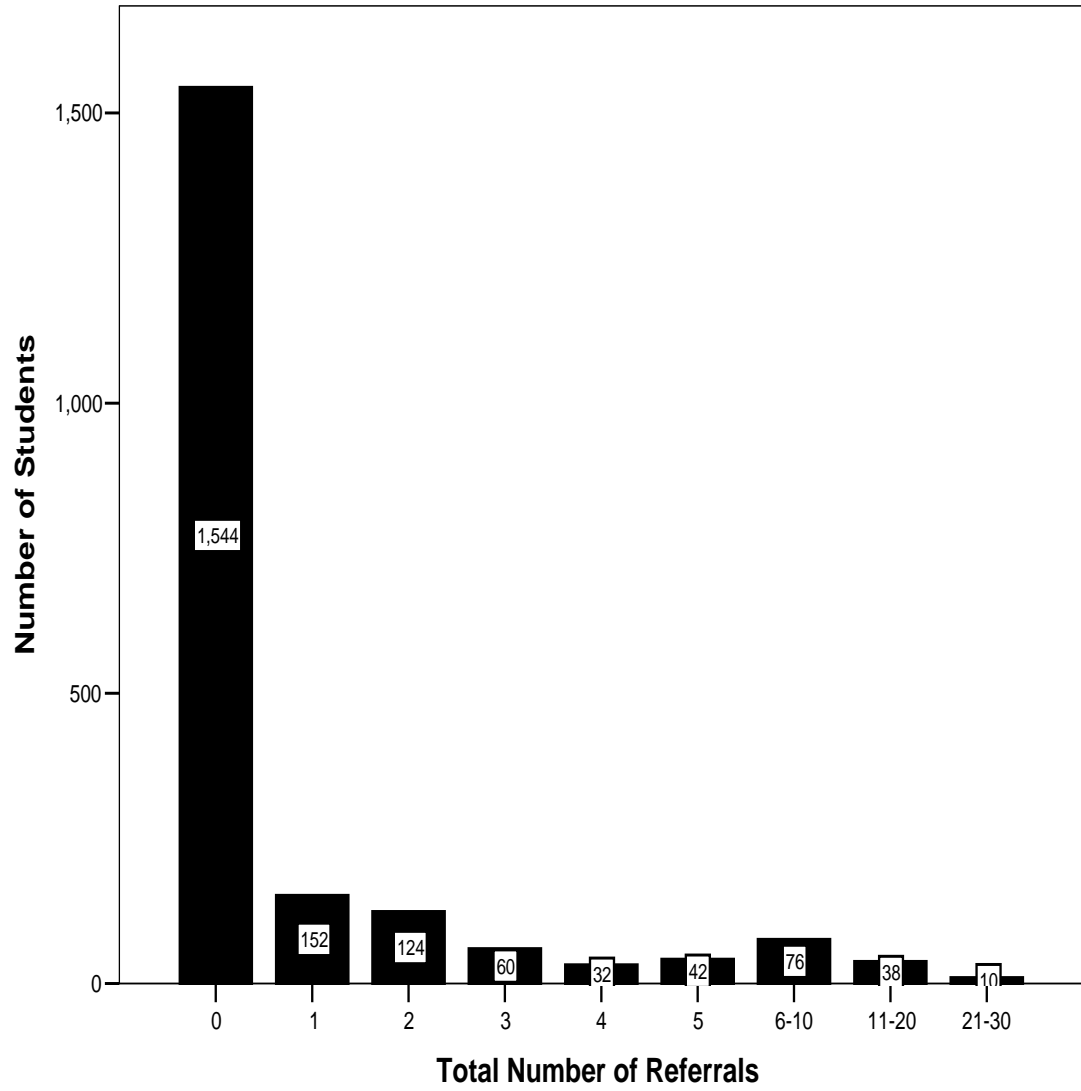
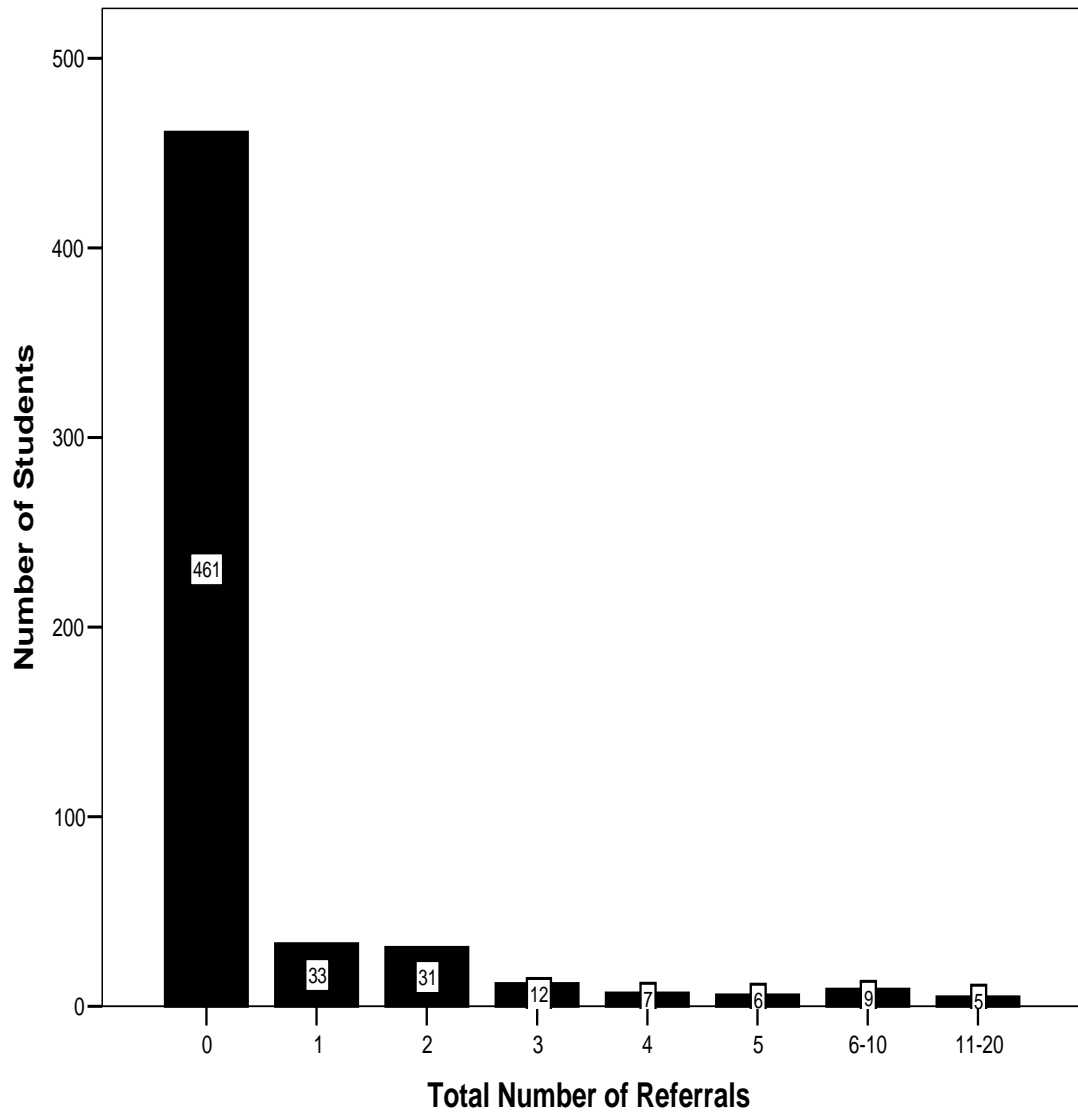


Figure 3: Bar Graph of the Total Number of Referrals per Student in the Promotive/Protective Sample ($n=564$)



outcome variables to create a more normal distribution for analyses. Results of the transformation for the initial sample, risk sample, and promotive/protective sample can be found in Table 6. The logarithmically transformed outcome variable was used in all analyses.

Table 6: Descriptive Statistics for DJJ Referrals for Birth, Risk, and Promotive/Protective Samples

	N	Mean	SD	Range	Skewness	Kurtosis
Birth Sample						
Pre-trans referrals	4432	1.40	3.96	0-70	5.12	41.12
Post-trans referrals	4432	-.15	0.01	-.69-4.26	1.79	1.80
Risk Sample						
Pre-trans referrals	2078	1.10	3.05	0-29	4.62	26.52
Post-trans referrals	2078	-.20	.93	-.69-3.38	1.73	1.93
Promotive Sample						
Pre-trans referrals	564	.58	1.83	0-19	5.31	35.81
Post-trans referrals	564	-.37	.73	-.69-2.97	2.24	4.18

Results

This study employed a variable-focused approach to determine the impact of individual factors on the dependent delinquency outcomes. For this approach a hierarchical regression model was utilized. Control variables were entered first, followed by risk factors, promotive factors, and then the interaction of selected risk and promotive factors to predict the delinquency referrals. The addition of promotive factors as main effects to the regression model determined whether adding assets or promotive factors to the risk model accounted for additional increase in variance over risk alone. The subsequent addition of interaction terms examined potential moderators involved in the relationship between independent variables and outcome. These analyses were first done for the entire sample, and then by gender and race when significant differences were present in Step 1.

Results of the analyses are reported in four major sections and reported for both the risk sample (n=2078) and the promotive/protective sample (n=564). These include: (1) descriptive statistics broken down by race and gender, (2) inter and cross-correlations for control, risk, promotive/protective, and outcome variables, (3) multiple hierarchical regression analyses of the contribution of risk and control factors to delinquency referrals, (4) multiple hierarchical regression analyses testing both the incremental main effect or promotive effects beyond risk, and moderator or protective effects of each potential protective factor. Additionally, multiple regression analyses are reported

separately by gender and race for regressions that indicate significant effects for gender and/or race effects in Step 1 of the regression equation.

Descriptive Statistics

Descriptive statistics for risk, promotive/protective, and outcome variables are provided in Table 7. Additionally, T-test results comparing those in the “risk sample” to those who were dropped from the original birth cohort are provided in Table 8. T-test results comparing the “promotive/ protective sample” to those who were dropped from the “risk sample” are presented in Table 9. Risk variables, collected between birth and fifth grade, have a consistently larger sample size than promotive variables collected between fifth and eighth grade. Risk variables assessed in the larger risk sample generally have means representing higher levels of risk than their corresponding risk variables in the smaller promotive sample.

Descriptive statistics on the outcome variable show a smaller range and mean for the promotive/protective sample compared to the risk sample, indicating that the subset of students in the promotive/protective sample had less delinquency involvement than the risk sample they were drawn from. In addition to the overall samples, descriptive statistics are provided for Black, White, male, and female samples of both the risk and promotive/protective samples (See Tables 10-13).

Correlations

Risk and control correlations. Table 14 displays the intercorrelations among the risk and control variables along with the cross-correlations of each risk variable with each control variable. Most correlations are significant and small to moderate in size. The control variable of SES, represented by free/reduced lunch status, yielded the strongest

Table 7: Descriptive Statistics for Risk and Promotive Samples

	<i>Risk Sample</i>				<i>Promotive Sample</i>			
	N	Mean	SD	Range	N	Mean	SD	Range
Externalizing Behaviors	2078	5.76	2.52	4-16	564	5.15	1.96	4-16
Prenatal Smoking	2078	1.48	.93	1-7	564	1.42	.85	1-6
APGAR Score	2078	8.09	1.30	1-10	564	8.26	.93	3-10
Mother's Education	2078	12.56	1.96	6-17	564	12.92	1.94	7-17
Birth Weight	2078	3348.42	557.46	879-5216	564	3373.95	523.83	1474-4848
Reading Score	2078	686.94	52.10	480-825	564	698.47	46.07	480-825
Marital Status	2078	.50	.50	0-1	564	.43	.50	0-1
Temperament	2078	2.50	.86	0-3	564	2.58	.79	0-3
Parental Strictness /Supervision	1162	21.94	4.38	8-32	564	22.26	3.92	8-32
Parental Acceptance /Involvement	1120	29.61	4.66	9-36	564	29.71	4.70	9-36
Parental Psychological Autonomy	1133	23.53	4.86	9-36	564	23.88	4.95	9-36
Activity Involvement	1747	13.70	3.75	7-35	564	13.98	3.79	7-35
Connection to Teacher	1716	18.03	6.44	0-28	564	18.47	6.25	0-28
Connection to School	1741	17.00	5.46	0-28	564	17.57	5.30	0-28
Parental Education Involvement	1579	18.81	3.20	9-27	564	19.04	3.24	9-27
Locus of Control	998	18.16	2.56	4-30	564	18.22	2.53	5-30
Total Number of Referrals	2078	1.10	3.04	0-29	564	.58	1.84	0-19

Table 8: T-tests of the Difference in Means between the Risk Sample and the Birth Sample Minus the Students in the Risk Sample

Risk Variable	Birth sample w/o Risk Sample (N=2354-1023) Mean (SD)	Risk sample (N=2078) Mean (SD)	T	Sig
Externalizing Behaviors	5.23 (3.24)	5.76 (2.52)	-8.27	p<.001
Prenatal Smoking	1.54 (1.12)	1.48 (.93)	3.18	p<.001
APGAR Score	7.92 (1.46)	8.09 (1.30)	-4.18	p<.001
Mother's Education	11.78 (2.08)	12.56 (1.96)	-12.88	p<.001
Birth weight	3241.37 (594.63)	3348.42 (557.46)	-6.18	p<.001
Reading Score	676.67 (55.97)	686.94 (52.10)	-5.03	p<.001
Marital Status	.56 (.50)	.50 (.50)	5.02	p<.001

Table 9: T-tests of the Difference in Means between the Promotive/Protective Sample and the Risk Sample Minus the Students in the Promotive/Protective Sample

Variable	Risk sample w/o Promotive/Protective Sample (N=1534-434) Mean (SD)	Promotive/Protective Sample (N=564) Mean (SD)	T	Sig
Externalizing Behaviors	5.98 (2.66)	5.15 (1.96)	-6.76	p<.01
Prenatal Smoking	1.50 (.95)	1.42 (.85)	-1.72	p>.05
APGAR Score	8.03 (1.37)	8.26 (.93)	3.70	p<.01
Mother's Education	12.43 (1.95)	12.92 (1.94)	5.08	p<.01
Birth weight	3338.90 (569.35)	3373.95 (523.83)	1.32	p>.05
Reading Score	682.64 (53.56)	698.47 (46.07)	6.21	p<.01
Marital Status	.52 (.50)	.43 (.50)	-3.94	p<.01
Temperament	2.45 (.88)	2.58 (.79)	3.19	p<.01
Parental Strictness /Supervision	21.64 (4.57)	22.26 (3.92)	2.47	p<.05
Parental Acceptance /Involvement	29.49 (4.63)	29.71 (4.70)	.78	p>.05
Parental Psychological Autonomy	23.19 (4.74)	23.88 (4.95)	2.39	p<.05
Activity Involvement	13.57 (3.73)	13.98 (3.79)	2.15	p<.05
Connection to Teacher	17.18 (6.52)	18.47 (6.25)	2.03	p<.05
Connection to School	16.73 (5.51)	17.57 (5.30)	3.05	p<.01
Parental Education Involvement	18.68 (3.18)	19.04 (3.24)	2.10	p<.05
Locus of Control	18.07 (2.60)	18.22 (2.53)	.94	p>.05
Total Number of Referrals	1.29 (3.37)	.58 (1.84)	-4.78	p<.01

Table 10: Descriptive Statistics by Race for Risk Sample

	<u>White Students</u>				<u>Black Students</u>			
	N	Mean	SD	Range	N	Mean	SD	Range
Externalizing Behaviors	1619	5.30	2.14	4-16	459	7.36	3.01	4-16
Prenatal Smoking	1619	1.52	.95	1-6	459	1.33	.82	1-7
APGAR Score	1619	8.14	1.12	1-10	459	7.92	1.69	1-10
Mother's Education	1619	12.82	1.95	6-17	459	11.65	1.70	7-17
Birth weight	1619	3412.92	539.32	879-5216	459	3120.89	561.35	1077-4593
Reading Score	1619	697.00	47.91	480-825	459	651.43	50.77	480-777
Marital Status	1619	.40	.49	0-1	459	.84	.37	0-1
Temperament	1619	2.53	.83	0-3	459	2.34	.92	0-3
Parental Strictness/Supervision	943	21.94	4.20	8-32	219	21.96	4.61	8-32
Parental Acceptance/Involvement	907	29.63	4.58	9-36	213	29.20	5.00	14-36
Parental Psychological Autonomy	919	23.76	4.81	9-36	214	22.56	4.93	12-34
Activity Involvement	1412	13.59	3.57	7-35	335	14.20	4.40	7-35
Connection to Teacher	1397	18.30	6.28	0-28	319	16.85	6.98	0-28
Connection to School	1412	17.11	5.30	0-28	329	16.54	6.08	0-28
Parental Education Involvement	1266	18.70	3.21	9-27	313	19.23	3.15	9-27
Locus of Control	807	18.18	2.58	4-30	191	18.05	2.52	5-24
Total Number of Referrals	1619	.77	2.39	0-27	459	2.26	4.49	0-29

Table 11: Descriptive Statistics by Gender for Risk Sample

	<i><u>Males</u></i>				<i><u>Females</u></i>			
	N	Mean	SD	Range	N	Mean	SD	Range
Externalizing Behaviors	1001	6.30	2.74	4-16	1077	5.25	2.17	4-16
Prenatal Smoking	1001	1.49	.95	1-7	1077	1.47	.91	1-6
APGAR Score	1001	8.08	1.42	1-10	1077	8.10	1.29	1-10
Mother's Education	1001	12.57	1.93	7-17	1077	12.55	1.98	6-17
Birth weight	1001	3442.91	542.47	992-5160	1077	3260.59	557.08	879-5216
Reading Score	1001	682.13	52.85	480-807	1077	691.41	51.01	480-825
Marital Status	1001	.49	.50	0-1	1077	.51	.50	0-1
Temperament	1001	2.43	.90	0-3	1077	2.54	.81	0-3
Parental	548	21.29	4.57	8-32	614	22.52	3.91	8-32
Strictness/Supervision								
Parental	523	29.47	4.70	9-36	597	29.73	4.63	9-36
Acceptance/Involvement								
Parental Psychological	530	22.54	4.91	11-36	603	24.40	4.45	9-36
Autonomy								
Activity Involvement	843	13.73	3.74	7-35	904	13.68	3.78	7-29
Connection to Teacher	823	18.29	6.31	0-28	893	17.79	6.56	0-28
Connection to School	841	16.85	5.10	0-28	900	17.15	5.78	0-28
Parental Education	738	18.87	3.32	9-27	841	18.75	3.10	9-27
Involvement								
Locus of Control	465	17.76	2.61	4-30	533	18.50	2.47	5-26
Total Number of Referrals	1001	1.57	3.72	0-29	1077	.66	2.16	0-27

Table 12: Descriptive Statistics by Race for Promotive/Protective Sample

	<i>White Students</i>				<i>Black Students</i>			
	N	Mean	SD	Range	N	Mean	SD	Range
Externalizing Behaviors	481	4.96	1.73	4-14	83	6.23	2.72	4-16
Prenatal Smoking	481	1.45	.89	1-6	83	1.23	.53	1-3
APGAR Score	481	8.21	.97	3-10	83	8.54	.55	7-10
Mother's Education	481	13.06	1.94	8-17	83	12.06	1.76	7-17
Birth weight	481	3414.13	526.21	1477-4848	83	3141.11	445.81	2240-4451
Reading Score	481	703.53	44.88	480-825	83	669.17	41.95	522-777
Marital Status	481	.37	.48	0-1	83	.76	.43	0-1
Temperament	481	2.61	.78	0-3	83	2.41	.86	0-3
Parental Strictness/Supervision	481	22.20	3.90	8-32	83	22.62	4.01	14-32
Parental Acceptance/Involvement	481	29.38	29.75	9-36	83	29.50	4.99	14-36
Parental Psychological Autonomy	481	23.83	4.65	9-36	83	23.57	4.74	12-34
Activity Involvement	481	13.78	3.54	7-29	83	15.19	4.85	7-35
Connection to Teacher	481	18.66	6.17	0-28	83	17.14	6.65	0-28
Connection to School	481	17.48	5.15	0-28	83	18.08	6.01	0-28
Parental Education Involvement	481	18.94	3.29	9-27	83	19.59	2.88	14-27
Locus of Control	481	18.24	2.52	11-30	83	18.14	2.58	5-24
Total Number of Referrals	481	.46	1.71	0-19	83	1.25	2.35	0-12

Table 13: Descriptive Statistics by Gender for Promotive/Protective Sample

	<i><u>Males</u></i>				<i><u>Females</u></i>			
	N	Mean	SD	Range	N	Mean	SD	Range
Externalizing Behaviors	255	5.62	2.24	4-16	309	4.77	1.60	4-14
Prenatal Smoking	255	1.46	.91	1-6	309	1.39	.81	1-6
APGAR Score	255	8.21	1.04	4-10	309	8.30	.92	3-10
Mother's Education	255	12.89	1.94	8-17	309	12.94	1.96	7-17
Birth weight	255	3469.77	518.51	1758-4763	309	3294.87	515.73	1474-4848
Reading Score	255	694.88	48.26	480-807	309	701.43	44.03	542-825
Marital Status	255	.43	.50	0-1	309	.42	.50	0-1
Temperament	255	2.54	.85	0-3	309	2.62	.74	0-3
Parental Strictness/Supervision	255	21.62	4.15	8-32	309	22.77	3.63	8-32
Parental Acceptance/Involvement	255	29.65	4.67	9-36	309	29.76	4.72	9-36
Parental Psychological Autonomy	255	23.00	4.85	11-35	309	24.60	4.91	9-36
Activity Involvement	255	14.19	3.84	7-35	309	13.82	3.74	7-29
Connection to Teacher	255	19.10	5.95	0-28	309	17.95	6.46	0-28
Connection to School	255	17.55	4.62	0-28	309	17.59	5.80	0-28
Parental Education Involvement	255	18.98	3.39	9-27	309	19.08	3.11	11-27
Locus of Control	255	17.73	2.46	11-30	309	18.63	2.52	5-26
Total Number of Referrals	255	.85	2.38	0-19	309	.36	1.17	0-12

Table 14: Intercorrelations among Risk and Control Variables (N=2078)

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
1. Gender	1	-.01	-.01	.01	.00	.00	.16**	-.09**	-.02	.21**
2. Race		1	.57**	-.08**	-.07**	-.25**	-.22**	-.36**	.36**	.34**
3. SES			1	.09**	-.07**	-.41**	-.19**	-.34**	.43**	.30**
4. Prenatal Smoking				1	-.01	-.23**	-.15**	-.11**	.06*	.09**
5. APGAR					1	.04	.11**	.07**	-.07**	-.06*
6. Mother's Education						1	.13**	.34**	-.30**	-.23**
7. Birth-weight							1	.11**	-.14**	-.04
8. Reading Scores								1	-.23**	-.33**
9. Marital Risk									1	.20**
10. Externalizing										1

*p<.05 **p<.01. Race= coded as 0) White, 1) Black; Gender coded as 0) female, 1) male; SES coded as 0) regular lunch 1) free or reduced lunch; Marital Status coded as 0) married, 1) other than married.

correlations including those with race ($r=.57$), marital status ($r=.43$), mother's education ($r=-.41$), reading scores ($r=-.34$), and externalizing behaviors ($r=.30$). Similar correlations were found when comparing these risk variables to race with relationships being similar to the relationship with SES, in large part due to the strong relationship between the two variables. Gender was less strongly correlated with the risk variables compared to the other control variables. Notable exceptions include higher externalizing behavior scores ($r=.21$) and birth weight ($r=.16$) being more associated with being male. Notable intercorrelations among the risk variables include mother's education and reading scores ($r=.34$); externalizing behaviors and reading scores ($r=-.33$); marital status and mother's education ($r=-.30$); and prenatal smoking and mother's education ($r=-.23$).

Promotive/protective intercorrelations. Table 15 displays the intercorrelations among the promotive/protective variables. Higher levels of correlations exist between variables that are subscales of a common measure. Examples include the connection to teacher and connection to school subscales of the Student Adjustment Survey ($r=.47$) and parental acceptance/involvement and parental strictness/supervision of the Parenting Practices Survey ($r=.42$). Other notable correlations occur with the parental education involvement variable being correlated with parental acceptance/involvement ($r=.37$) and parental strictness/supervision ($r=.28$).

Protective, risk, and control correlations. Table 16 contains the cross correlations between the protective variables and the risk and outcome variables. In general, correlations are small and indicate a negative relationship between level of risk and level of promotion/protection, with lower risk indicating higher protection and higher protection indicating lower risk. Notable correlations include gender with parental

Table 15: Intercorrelations Among Promotive/Protective Variables (N=1747-813)

	1.	2.	3.	4.	5.	6.	7.	8.	9.
1. Temperament	1	.08**	.09**	.04	.04	.06**	.08**	.09**	.07*
2. Parental Strictness/ Supervision		1	.42**	-.06*	.07*	.05	.18**	.28**	.10**
3. Parent Acceptance/ Involvement			1	.01	.08*	.13**	.27**	.37**	.00
4. Parental Psychological Autonomy				1	.00	-.02	-.01	-.04	.11**
5. Activity Involvement					1	.03	.17**	.17**	-.04
6. Connection to Teachers						1	.47**	.05	-.01
7. Connection to School							1	.21**	.01
8. Parental Educational Involvement								1	.21**
9. Locus of Control									1

*p<.05 **p<.01

Table 16: Correlations of Control and Risk Variables with Promotive/Protective Variables (N=2078-998)

	Gender	Race	SES	Externalizing	Prenatal smoking	Apgar Score	Mom Edu.	Birth-weight	Reading Score	Marital Status
1. Temperament	-.06**	-.09**	-.10**	-.18**	.11**	.03	.09**	.04	.13**	-.11**
2. Parental Strictness/ Supervision	-.15**	.00	.01	-.17**	-.07*	.00	.05	-.06	.09**	-.11**
3. Parent Autonomy	-.03	-.01	-.06	-.08*	-.05	.04	-.08*	-.02	-.02	-.08**
4. Parental Acceptance Involvement	-.19**	-.10**	-.11**	-.10**	-.03	.05	.07*	-.01	.11**	-.05
5. Activity Involvement	.01	.06**	.00	.00	-.07**	.00	.11**	.03	.03	-.04
6. Connection to Teachers	.04	-.09**	-.04	-.09**	.01	.03	.05	.02	.08**	-.02
7. Connection to School	-.03	-.04	-.01	-.16**	-.01	.01	.06*	-.02	.09**	-.07**
8. Parental Educational Involvement	.02	.07**	-.05	-.05	-.08	-.04	.15**	-.02	.00	-.10**
9. Locus of Control	-.15**	-.02	-.01	-.06	-.02	.03	.01	-.01	.07*	-.01

*p<.05 **p<.01

acceptance/involvement ($r=-.19$), parental strictness supervision ($r=-.15$), and locus of control ($r=-.15$). Females report higher levels of these three promotive/protective variables. Fifth grade teacher -reported externalizing behaviors had the highest correlations with the promotive/protective variables. Apgar score and birth weight were not significantly related to any of the promotive/protective variables. Temperament and parental acceptance/involvement contained the largest number of significant correlations with the risk and control variables.

Correlations with outcomes. Table 17 displays the results of correlations between the outcome variable of total number of Florida Department of Juvenile Justice delinquency referrals and the control, risk, and promotive/protective variables. Correlations are shown for both the pre- and post-transformation outcome variable, total number of delinquency referrals. In general, the relationships increased minimally post-transformation. Results will be reported for the transformed outcome variable. All risk variables were correlated in the expected direction with higher levels of risk relating to higher numbers of referrals. The highest correlations were with externalizing behaviors ($r=.40$), 3rd grade reading scores ($r=-.23$), mother's education ($r=-.21$), and marital status ($r=.22$). Similarly, each promotive/protective variable was negatively correlated with the number of referrals indicating that higher levels of these variables relate to lower numbers of referrals. Notable correlations with delinquency referrals included temperament ($r=-.17$), parental acceptance/involvement ($r=-.16$), and parental strictness/supervision ($r=-.15$). Additionally, moderate correlations were found with each of the control variables and delinquency referrals.

Table 17: Correlation of Control, Risk, and Promotive/Protective Variables with Total Number of Referrals (n=2078-998)

Predictor Variable	Untransformed Referrals	Transformed Referrals
Control		
Gender	.15**	.16**
Race	.20**	.24**
SES	.22**	.27**
Risk Factor		
Reading scores	-.20**	-.23**
Mother's Education	-.17**	-.21**
Prenatal smoking	.11**	.12**
Apgar score	-.02	-.02
Birth weight	-.05*	-.06*
Marital Status	.17**	.22**
Externalizing behaviors	.35**	.40**
Promotive Factor		
Temperament	-.16**	-.17**
Activity Involvement	-.01	-.01
Parental Education Involvement	-.03	-.05
Connection to Teacher	-.03	-.04
Connection to School	-.07**	-.09**
Locus of Control	-.07**	-.08**
Parental Strictness/Supervision	-.13**	-.15**
Parental Acceptance/Involvement	-.17**	-.16**
Parental Psychological Autonomy	-.03	-.06*

*p<.05 **p<.01. Race= coded as 0) White, 1) Black; Gender coded as 0) female, 1) male; SES coded as 0) regular lunch 1) free or reduced lunch; Marital Status coded as 0) married, 1) other than married.

Based on these relationships, correlations were also examined separately by gender and race (See Table 18). Once again, externalizing behavior represented the highest correlations for each of the gender and racial groups. Additionally, promotive/protective variables with the strongest outcome correlations were temperament, parental acceptance/involvement, and parental strictness/supervision. Birth weight, which was insignificant in other correlations, was significantly negatively related to the number of referrals for females. Although these correlational analyses provide information about the strength of the relationships between the individual variables and the outcome, they fail to account for the relationships the predictor variables have with each other. Regression analyses were performed as a more stringent test of the relationship between the predictor variables and the outcome.

Table 18: Correlation of Control, Risk, and Promotive/Protective Variables By Gender and Race to Total Number of Delinquency Referrals

	Number of Referrals			
	Male	Female	White	Black
Control Variables				
Gender	**	**	-.20**	.11*
Race	.20**	.31**	**	**
SES	.26**	.31**	.14**	.24**
Risk Variables				
Prenatal Smoking	.12**	.12**	.15**	.13**
APGAR	-.02	-.02	.01	-.03
Mother's Education	-.19*	-.25**	-.15**	-.23**
Birth weight	-.08	-.10**	.00	-.01
Reading Scores	-.21**	-.23**	-.14**	-.21**
Marital Risk	.24**	.21**	.15**	.14**
Externalizing Behaviors	.38**	.37**	.32**	.37**
Protective Variables				
Temperament	-.18**	-.13**	-.16**	-.14**
Parental Strictness/ Supervision	-.11**	-.15**	-.14**	-.17**
Parent Acceptance/ Involvement	-.18**	-.12**	-.16**	-.19**
Parental Psychological Autonomy	-.03	-.02	-.02	-.11
Activity Involvement	-.03	.01	-.06*	.03
Connection to Teachers	-.03	-.08*	-.05	.05
Connection to School	-.07*	-.12**	-.10**	-.05
Parental Educational Involvement	-.05	-.06	-.06*	-.09
Locus of Control	-.04	-.09*	-.07*	-.12

*p<.05 **p<.01. Race= coded as 0) White, 1) Black; Gender coded as 0) female, 1) male; SES coded as 0) regular lunch 1) free or reduced lunch; Marital Status coded as 0) married, 1) other than married.

Regression Analyses

Risk regressions. Regression analyses were used to examine the first hypothesis that risk variables would contribute a significant amount of variance to referrals beyond that accounted for by the control variables of gender, race, and SES. Hierarchical multiple regression was used to predict the total number of juvenile justice referrals using the sample comprised of students with complete sets of data for control and risk variables ($n=2078$). Gender, race, and SES were entered into Step 1 of the regression model to determine their relationship to referrals. All seven potential risk factors were then entered into Step 2 to determine the amount of variance attributed to the set of risk factors beyond that accounted for by the control variables. Results of this analysis are found in Table 19. Gender, race, and SES were found to contribute to 11% of the variance in referrals. The combined Step 2 risk factors were found to contribute an additional 10% of the variance in referrals with fifth grade teacher-reported externalizing behaviors ($\beta=.29$, $p < .01$), parental marital status other than married up through the fifth grade ($\beta=.08$, $p < .01$), and prenatal smoking ($\beta=.07$, $p < .01$) as the strongest risk factors.

Additionally, since both gender and race were significant predictors in Step 1, separate regression models were created for male, female, Black, and White students (See Tables 20 and 21). For males, Step 1, comprised of race and SES, contributed to 7% of the variance in referrals. Step 2, containing risk factors, contributed an additional 12% of the variance. For males, externalizing behaviors ($\beta=.30$, $p < .01$) and marital status ($\beta=.13$, $p < .01$) were the strongest predictors.

Table 19: Regression of Risk Factors on Total Number of Delinquency Referrals

Step/ Risk Factor	β	β^1	R	R ²	ΔR^2
All (N=2078)					
1. Control			.34	.11	.11**
Gender	.11**	.17**			
Race	.05	.13**			
SES	.09**	.20**			
2. Risk			.46	.21	.10**
Externalizing Behavior	.29**				
Prenatal Smoking	.07**				
Apgar Score	.02				
Mother's Education	-.05*				
Birth Weight	-.01				
Reading Score	-.04				
Marital Status	.08**				

β = Beta at final Step. β^1 = Beta at first Step.

*p<.05 **p<.01. Race= coded as 0) White, 1) Black; Gender coded as 0) female, 1) male; SES coded as 0) regular lunch 1) free or reduced lunch; Marital Status coded as 0) married, 1) other than married.

Table 20: Regression of Risk Factors on Total Number of Delinquency Referrals by Gender

Step/ Variable	β	β^1	R	R ²	ΔR^2
Males (N=1001)					
1. Control			.27	.07	.07**
Race	-.01	.08*			
SES	.09*	.21**			
2. Risk			.43	.19	.12**
Externalizing Behavior	.30**				
Prenatal Smoking	.07*				
Apgar Score	.03				
Mother's Education	-.02				
Birth Weight	-.01				
Reading Score	-.05				
Marital Status	.13**				
Step/ Risk Factor	β	β^1	R	R ²	ΔR^2
Females (N=1077)					
1. Control			.35	.12	.12**
Race	.13**	.20**			
SES	.09*	.20**			
2. Risk			.45	.20	.08**
Externalizing Behavior	.25**				
Prenatal Smoking	.07*				
Apgar Score	.01				
Mother's Education	-.09**				
Birth Weight	.00				
Reading Score	-.02				
Marital Status	.03				

β = Beta at final Step. β^1 = Beta at first Step.

* $p < .05$ ** $p < .01$. Race= coded as 0) White, 1) Black; SES coded as 0) regular lunch 1) free or reduced lunch; Marital Status coded as 0) married, 1) other than married.

Table 21: Regression of Risk Factors on Total Number of Delinquency Referrals by Race

Step/ Risk Factor	β	β^1	R	R ²	ΔR^2
White (N=1619)					
1. Control			.24	.06	.06**
Gender	.14**	.20**			
SES	.06*	.14*			
2. Risk			.39	.16	.10**
Externalizing Behavior	.26**				
Prenatal Smoking	.07**				
Apgar Score	.03				
Mother's Education	-.04				
Birth Weight	-.01				
Reading Score	-.02				
Marital Status	.10**				
Step/ Risk Factor	β	β^1	R	R ²	ΔR^2
Black (N=459)					
1. Control			.26	.07	.07**
Gender	.06	.12**			
SES	.12*	.24**			
2. Risk			.43	.19	.12**
Externalizing Behavior	.29**				
Prenatal Smoking	.09*				
Apgar Score	.01				
Mother's Education	-.10*				
Birth Weight	.00				
Reading Score	-.07				
Marital Status	.01				

β = Beta at final Step. β^1 = Beta at first Step.

* $p < .05$ ** $p < .01$. Gender= coded as 0) Female, 1) Male; SES coded as 0) regular lunch
1) free or reduced lunch; Marital Status coded as 0) married, 1) other than married.

For females, Step 1, comprised of race and SES, contributed to 12% of the variance in referrals. Step 2, containing risk factors, contributed an additional 8% of the variance. For females, externalizing behaviors ($\beta=.25$, $p < .01$) and mother's education ($\beta=-.09$, $p < .01$) were the strongest predictors.

For White students Step 1, comprised of gender and SES, contributed 6% of the variance in referrals, and Step 2 contributed an additional 10% of the variance. Externalizing behaviors ($\beta=.26$, $p < .01$), marital status ($\beta=.10$, $p < .01$), and prenatal smoking ($\beta=.07$, $p < .01$) were the strongest predictors for White students. For Black students, gender and SES contributed to 7% of the variance in referrals, and Step 2 contributed an additional 12% of the variance. Externalizing behaviors ($\beta=.29$, $p < .01$), mother's education ($\beta=-.10$, $p < .05$), and prenatal smoking ($\beta=.09$, $p < .05$) were the strongest predictors for Black students.

Promotive Regressions. To test the second hypothesis that positive, promotive variables would have additional main effects with significance above that accounted for by control and risk variables, a second set of hierarchical multiple regressions were computed. These predicted the total number of juvenile justice referrals using the sample comprised of students with complete sets of data for control, risk, and promotive variables ($n=564$). The nine promotive variables were entered into Step 3 to determine the amount of additional variance accounted for by this set of variables. Results of this analysis are found in Table 22. Control variables contribute 9% of the variance in total number of referrals. Risk factors contributed an additional 10% of variance in referrals with fifth grade teacher reported externalizing behaviors ($\beta= .26$, $p < .01$), and

Table 22: Regression of Risk and Promotive Factors on Total Number of Delinquency Referrals

Step/ Risk Factor	β	β^1	R	R ²	ΔR^2
All (N=564)					
1. Control			.31	.09	.09**
Gender	.06	.16**			
Race	.09	.13**			
SES	.08	.19**			
2. Risk			.44	.19	.10**
Prenatal Smoking	.08				
Apgar	-.01				
Mother's Education	-.09*				
Birth Weight	-.01				
Reading Scores	-.02				
Marital Status	.03				
Externalizing Behaviors	.26**				
3. Promotive			.47	.22	.04**
Temperament	.01				
Parental Psychological Autonomy	-.04				
Parental Acceptance/Involvement	-.13**				
Parental Strictness/Supervision	.04				
Activity Involvement	.02				
Connection to Teacher	-.03				
Connection to School	.04				
Locus of Control	-.11**				
Parental Education Involvement	.03				

β = Beta at final Step. β^1 = Beta at first Step.

* $p < .05$ ** $p < .01$. Race= coded as 0) White, 1) Black; Gender coded as 0) female, 1) male; SES coded as 0) regular lunch 1) free or reduced lunch; Marital Status coded as 0) married, 1) other than married.

mother's education ($\beta = -.09$, $p < .05$) as the strongest risk factors. The promotive step contributed an additional 4% increase in variance. The significant promotive factors were parental acceptance/involvement ($\beta = -.13$, $p < .01$) and locus of control ($\beta = -.11$, $p < .01$).

Both gender and race were significant predictors in Step 1 of the analysis. In separate promotive regression models for male, female, Black, and White students, only males and White students had significant promotive steps. For males, the control variables contributed 8% of the variance in total number of referrals (See Table 23). Step 2 risk factors contributed an additional 15% of the variance in the outcome variable with fifth grade teacher reported externalizing behaviors ($\beta = .31$, $p < .01$) as the only significant risk factor. The promotive step contributed to an additional 5% increase in variance. The significant promotive factors were parental acceptance involvement ($\beta = -.18$, $p < .01$) and locus of control ($\beta = -.11$, $p < .05$).

For White students, the control variables contributed 4% of the variance in total number of referrals (See Table 24). Step 2 risk factors were found to contribute an additional 9% of the variance in delinquency referrals with fifth grade teacher reported externalizing behaviors ($\beta = .22$, $p < .01$) and mother's education ($\beta = -.09$, $p < .05$) as the strongest risk factors. The promotive step contributed an additional 4% increase in variance. The significant promotive factors for White students were also parental acceptance involvement ($\beta = -.14$, $p < .01$) and locus of control ($\beta = -.09$, $p < .05$).

Table 23: Regression of Risk and Promotive Factors on Total Number of Delinquency Referrals for Males

Step/ Risk Factor	β	β^1	R	R ²	ΔR^2
Males (N=255)					
1. Control			.27	.08	.08**
Race	.03	.11**			
SES	.08	.21**			
2. Risk			.47	.22	.15**
Prenatal Smoking	.04				
Apgar	-.05				
Mother's Education	-.08				
Birth Weight	-.03				
Reading Scores	-.03				
Marital Status	-.09				
Externalizing Behaviors	.31**				
3. Promotive			.53	.28	.05*
Temperament	-.01				
Parental Psychological Autonomy	.07				
Parental Acceptance/Involvement	-.18**				
Parental Strictness/Supervision	-.01				
Activity Involvement	.07				
Connection to Teacher	.07				
Connection to School	-.07				
Locus of Control	-.11*				
Parental Education Involvement	.07				

β = Beta at final Step. β^1 = Beta at first Step.

* $p < .05$ ** $p < .01$. Race= coded as 0) White, 1) Black; SES coded as 0) regular lunch 1) free or reduced lunch; Marital Status coded as 0) married, 1) other than married.

Table 24: Regression of Risk and Promotive Factors on Total Number of Delinquency Referrals for White Students

Step/ Risk Factor	β	β^1	R	R ²	ΔR^2
Whites (N=481)					
1. Control			.19	.04	.04**
Gender	.09	.16**			
SES	.03	.12**			
2. Risk			.26	.13	.09**
Prenatal Smoking	.09				
APGAR	-.02				
Mother's Education	-.09*				
Birth weight	-.05				
Reading Scores	-.01				
Marital Status	.05				
Externalizing Behaviors	.22**				
3. Promotive			.41	.16	.04*
Temperament	.00				
Parental Psychological Autonomy	.07				
Parental Acceptance/Involvement	-.14**				
Parental Strictness/Supervision	-.06				
Activity Involvement	.05				
Connection to Teacher	-.02				
Connection to School	.01				
Locus of Control	-.09*				
Parental Education Involvement	.06				

β = Beta at final Step. β^1 = Beta at first Step.

* $p < .05$ ** $p < .01$. Gender= coded as 0) Female, 1) Male; SES coded as 0) regular lunch
1) free or reduced lunch; Marital Status coded as 0) married, 1) other than married.

Protective Regressions. Hypotheses 3-7 examined potential moderator effects by looking at interactions between individual risk and promotive/protective variables. The set of these five interactions were entered into Step 4 of the regression model after the control, risk, and promotive steps. Each interaction term was created by multiplying the individual centered risk and promotive factors together. Contrary to prediction, the protective step did not contribute a significant amount of variance beyond that of the control, risk, and promotive steps ($\Delta R^2=.01$, ns). However, because race and gender were significant predictors in Step 1 of the model, analyses were also computed for male, female, Black, and White students. The protective step was found to be significant for females, even though there was no main effect for the nine promotive factors for females (See Table 25). The protective step contributed an additional 4% increase in variance beyond that accounted for by the control, risk, and promotive steps for a total of 23% of the variance in the number of delinquency referrals accounted for by the model.

The significant interactions in this model included parental acceptance involvement and parental marital status (See Figure 2) as well as reading scores and parental education involvement (See Figure 3). The graph of the interaction of parental acceptance involvement and marital status was created by graphing the regression of parental acceptance involvement on number of delinquency referrals for both those with and without marital status risk. However, because the reading score risk variable is a naturally continuous variable, artificial dichotomization was used to graph the regression of parental education involvement on delinquency referrals for those with reading scores one standard deviation below the mean and those with reading scores one standard deviation above the mean. The graph of the interaction for parental acceptance/

Table 25: Regression of Risk, Promotive, and Protective Variables on Total Number of Delinquency Referrals for Females

Step/ Risk Factor	β	β^1	R	R ²	ΔR^2
Females (N=309)					
1. Control			.29	.09	.09**
Race	.18**	.16**			
SES	.07	.18**			
2. Risk			.39	.15	.07**
Prenatal Smoking	.15**				
Apgar	.11*				
Mother's Education	-.13*				
Birth Weight	.02				
Reading Scores	.03				
Marital Status	-.06				
Externalizing Behaviors	.12*				
3. Promotive			.43	.19	.04
Temperament	.04				
Parental Psychological Autonomy	.01				
Parental Acceptance/Involvement	-.03				
Parental Strictness/Supervision	-.09				
Activity Involvement	.02				
Connection to Teacher	-.08				
Connection to School	.01				
Locus of Control	-.15				
Parental Education Involvement	-.06				
4. Protective			.47	.23	.04*
Acceptance Involvement X	.13*				
Marital Status					
Reading Scores X Parent	.14*				
Education Involvement					
Mother's Education X Connection	.09				
to Teacher					
Reading Scores X Connection to	-.01				
School					
Prenatal Smoking X Activity	.06				
Involvement					

β = Beta at final Step. β^1 = Beta at first Step.

*p<.05 **p<.01. Race= coded as 0) White, 1) Black; SES coded as 0) regular lunch 1) free or reduced lunch; Marital Status coded as 0) married, 1) other than married.

Figure 4: Interaction of Marital Status and Parental Acceptance Involvement on Total Number of Delinquency Referrals for Females

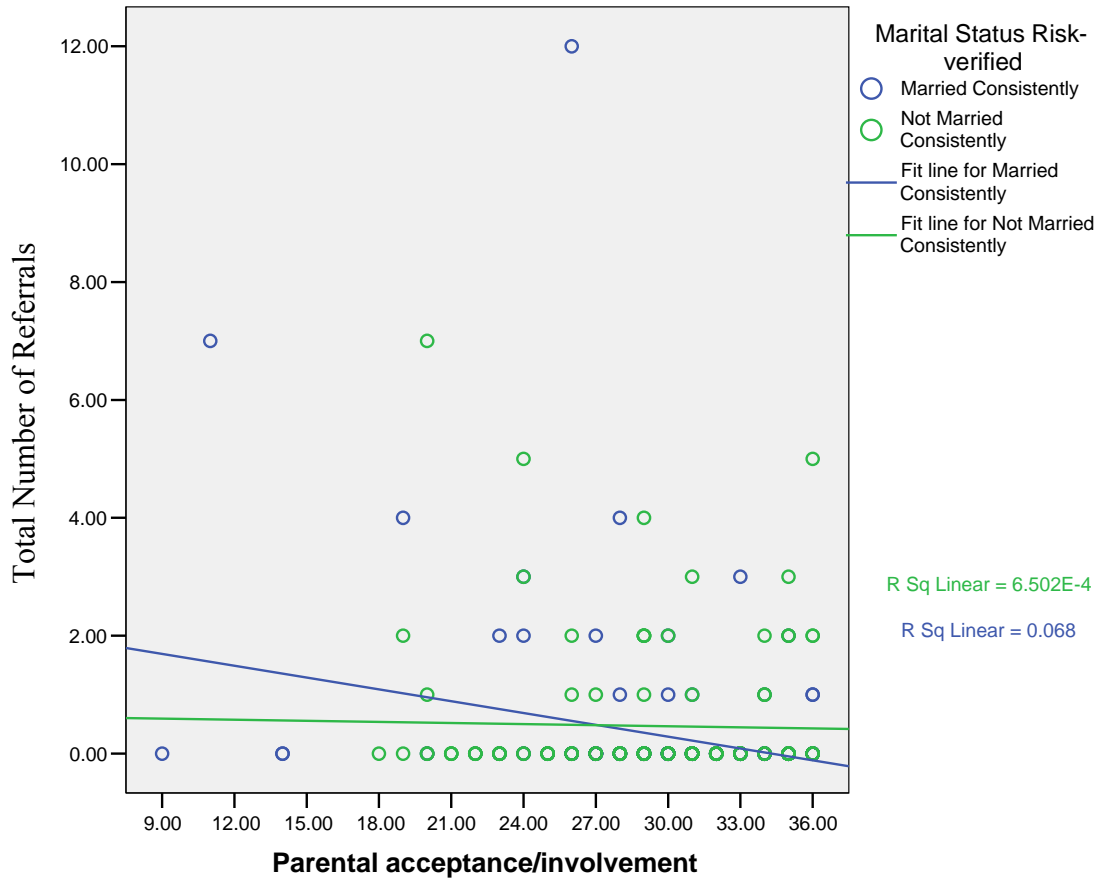
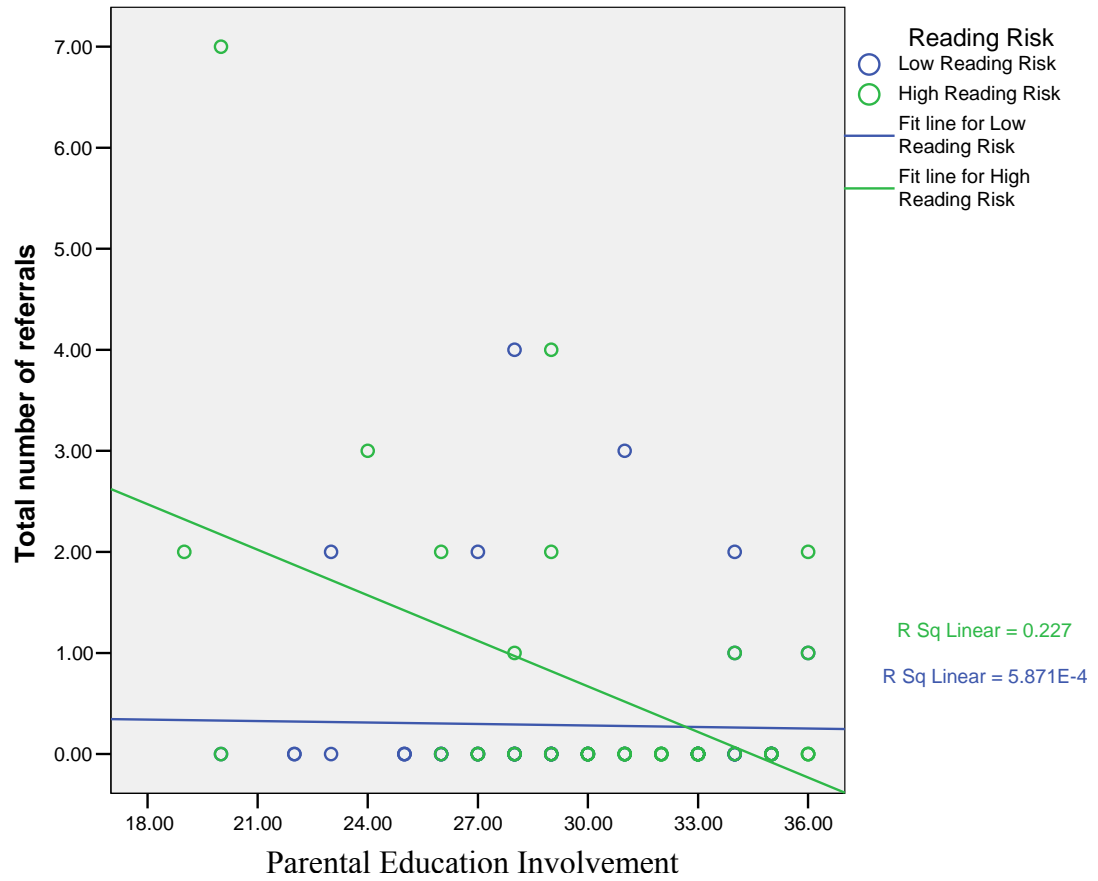


Figure 5: Interaction of Reading Scores and Parental Education Involvement on Total Number of Delinquency Referrals



involvement and marital status indicates a more dramatic decrease in the number of referrals as parental acceptance/involvement increases for females with married parents than for females with a parental marital status other than married. The graph of the interaction of reading scores and parental education involvement indicated a more significant decrease in delinquency referrals as parental education involvement increases for females with lower third grade standardized reading scores than those with higher scores.

Discussion

A primary goal of this study was to determine the extent to which early risk factors predicted delinquency referrals. A second focus was the identification of promotive assets that decrease the risk of delinquency referrals. A third focus was to identify those protective assets that moderate the relationship between the early risk factors and number of delinquency referrals. An additional goal was to identify gender and racial differences in these relationships. Study findings are discussed first, followed by study limitations, and finally future policy, practice, and research recommendations.

Control Variables

Both bivariate correlations and multiple regression analyses revealed strong relationships between each of the control variables and the outcome variable. These relationships were in the expected direction where being male, Black, or poor was related to increased numbers of delinquency referrals in both the risk and promotive/protective samples when not including the influence of other risk or promotive/protective variables. High collinearity was found between being Black and having free/reduced lunch status, our proxy for SES ($r = .57$). This finding parallels U.S. Census records indicating that Blacks are more likely to live in poverty than Whites, Hispanics, and Asians (US Census Bureau, 2004). The control step in the current investigation accounted for 11% of the variance in the sample including only risk variables and 9% of the variance in the sample that included both risk and promotive/protective variables. This finding is also consistent

with another large study of predictors of delinquency that found such variables to account for 10% of the variance in delinquency outcomes (Jessor, 1995).

Not surprisingly, our measure of SES was the strongest of the predictor control variables. This finding is consistent with prior research including a classic comprehensive review of delinquency, which found SES to be one of the best predictors of delinquency (Yoshikawa, 1994). Others have suggested that effects of race and SES reflect a representation of neighborhood characteristics (Stouthamer-Loeber et al., 2002). In a study on the effects of risk and promotive factors in accounting for serious delinquency in males, these researchers determined that individuals in disadvantaged neighborhoods had more risk factors and fewer promotive factors than those in advantaged neighborhoods, but that the relationships between risk and promotive factors and delinquency was predictive and linear regardless of neighborhood SES (Stouthamer-Loeber et al., 2002). Although a series of articles by Loeber and colleagues suggests that delinquency is most highly concentrated in neighborhoods with the lowest SES, and that neighborhood SES is more predictive of delinquency outcomes than family SES, we did not have data at the neighborhood level and were only able to investigate the effects of SES at the individual level.

Risk Factors

The risk factor step contributed to significant increases in variance in total number of discipline referrals above that accounted for by gender, race, and SES in both the risk regression model (10%) and the model that also included promotive/protective variables in Step 3 (10%). Minimal differences were noted between the predictive ability of individual risk factors in Step 2 in the risk regression model (See Table 19) and Step 3 in

the promotive/protective model (See Table 22). An additional analysis revealed that the significance of risk variables in Step 2 of the risk sample was comparable to that of Step 2 in the smaller sample that included both risk and promotive/protective variables (See Appendix C). Differences in the significance of risk variables in Step 2 of the “risk model” and Step 3 of the smaller model with both risk and promotive/protective data were due to compositional discrepancies between the two samples based on attrition, and will be discussed in the limitations section. Discussion of risk factors will focus on those results found in the larger risk regression sample.

Birth-related risk factors. Although there has been strong evidence to indicate a relationship between prenatal substance use, including prenatal cigarette smoking, and conduct problems (Brennan et al, 1999; Brennan et al, 2002; Fergusson et al, 1998, Maughan, Taylor, Taylor, Butler, & Bynner, 2001; Wakschalag, Pickett, Cook Jr, Benowitz, & Leventhal, 2002), there has been mixed evidence regarding the influence of several other birth-related risk factors including delivery complications, gestational age, birth weight, and Apgar scores on behavioral outcomes (Beck & Shaw, 2005; Bor et al., 2004). Even in studies that have found predictive utility for prenatal stressors, the results are usually qualified by an interaction effect rather than a main effect on delinquency (Beck et al., 2005; Gibson et al., 1998; Werner, 1993). For example, in the Kauai longitudinal study, the effects of perinatal risk factors on delinquency were found to be most predictive for children who also had early family problems including absence of father, separation for parents, and parental mental health issues (Werner, 1993).

Of the three birth-related variables examined, support was only found for the connection between prenatal smoking and delinquency, with those students whose

mothers reported higher levels of cigarette smoking during pregnancy having higher levels of delinquency referrals. This finding has been highly supported in the literature but has been primarily based on findings among males with less consensus regarding the connection between prenatal smoking and delinquency in females (Brennan et al, 2002; Wakschlag & Hans, 2002). In the current investigation, this relationship held true for all models regardless of gender or race. These results support studies by Brennan and colleagues (1999, 2002) that found a dose-response relationship between the amount of prenatal smoking and criminal arrest in both males and females after controlling for potential demographic, parental, and perinatal risk confounds. Additionally, a recent review of research on the connections between prenatal nicotine exposure and antisocial behaviors concluded that there is support for a connection independent of confounds and present across settings (Wakschlag & Hans, 2002). The current study indicates that prenatal smoking not only affects serious adult antisocial behavior but also predicts juvenile delinquency referrals.

Numerous pathways by which maternal prenatal cigarette smoking affects delinquency have been hypothesized. One possibility is that prenatal exposure to nicotine increases the risk of substance abuse, which in turn increases the risk of arrest (Brennan et al., 2002; Ernst, Moolchan, & Robinson, 2001). However, investigating the influence of substance abuse as a mediator for delinquency referrals was not possible in the current study as data concerning student substance abuse was not available. Another common explanation for the effect of prenatal smoking on delinquency is via neurological impairment sustained in utero from the effects of nicotine (Ernst et al., 2001). Other explanations that have been cited include links with parenting practices,

birth complications, and SES. However, even when including the combined effects of SES, birth weight, and Apgar scores, prenatal smoking remained a significant predictor in the current study. Although parenting practices were examined in the promotive/protective regression, only parental acceptance/involvement remained a significant predictor of delinquency. Of the three parenting variables examined, only parental strictness/supervision was significantly correlated with prenatal smoking, and the correlation was modest in size ($r=.07$, $p<.05$), minimizing the possibility that the relationship between prenatal smoking and delinquency was mediated by parenting practices in the current study.

Apgar scores were not related to the number of delinquency referrals. Few studies have examined Apgar scores as a predictor of behavioral problems including delinquency, and the results have been weak at best. In an Australian longitudinal study of early risk factors for antisocial behaviors in over 5,000 adolescents, Apgar scores were not correlated with behavioral outcomes (Bor et al., 2004). Additionally, the major study that found effects for Apgar scores did not show independent effects on delinquency (Gibson et al., 2000). Gibson's longitudinal study of low SES males indicated that the *combination* of Apgar scores and maternal smoking was significantly related to later offending behaviors. However no independent effect on delinquency for either of the two predictors was found.

Similarly, birth weight was not predictive of delinquency in any of the regression models. Birth weight was significantly but weakly negatively correlated with delinquency ($r=-.06$, $p<.05$) indicating a trend for individuals with lower birth weights to be more likely to engage in delinquent acts. However, when examined by race and

gender, birth weight was only significantly correlated with delinquency for females ($r=.10, p<.01$). This finding parallels recent research revealing that individuals classified as low birth weight and very low birth weight are not at increased risk for delinquency (Gardner et al., 2004; Hack et al., 2002; Hack et al., 2004). A recent study of low birth weight individuals located in mainstream schools indicated that these individuals were not only at no increased risk for internalizing or externalizing problems than other students, but were actually at *less* risk for delinquency than control students (Gardner et al., 2004). Additionally, a survey comparing the outcomes of very low birth weight and normal birth weight individuals at age 20 found less prevalence of drug and alcohol use among the very low birth weight individuals (Hack et al., 2002). Although previous findings had suggested a number of maladaptive outcomes associated with low birth weight status, more recent studies suggest that improvements in medical treatment and technology have helped to reduce many of the deleterious outcomes previously linked to low birth weight individuals.

Family-Related Risk Factors

The family related risk variables of low maternal education level and unstable marital status were significantly correlated with each other ($r=-.30, p<.01$) and were also highly correlated with other risk and control variables, particularly SES (mother's education, $r=-.41, p<.01$; marital status, $r=.43, p<.01$). Low maternal education has been cited repeatedly as a risk factor for antisocial behavior (Stouthamer-Loeber et al., 2002). Findings in the current study support this connection by revealing the ability of mother's education to predict delinquency even after controlling for the effects of other strong predictors such as poverty variables. Unique to the current study was the ability of

mother's education to significantly predict delinquency referrals in the risk regression models for female and Black students only. This finding may imply that these students are particularly vulnerable to the effects of having a mother with a lower education level. An alternate explanation concerns the strong effects of additional variables, particularly marital status for male and White students that may have reduced the amount of unique variance accounted for by mother's education in the number of discipline referrals. Unstable marital status, measured in the current study as either being born to a unmarried mother or having a reported status of parents other than married between birth and 5th grade, was not only a significant risk factor in the overall risk regression model, but was also a significant predictor for males and White students. This follows previous research, which has also found unstable marital status to be more predictive of delinquency for males than for females (Conseur, et al., 1997). The finding of unstable marital status being more predictive for White students than Black students may be related to the greater levels of variability in parental marital status for White students. In the sample of 2078 students, 40% of the White students had parents with an unstable marital status compared to 84% of the Black students.

Individual Risk Factors

Fifth grade teacher rated externalizing behaviors and third grade standardized reading scores yielded the largest correlation coefficients with the number of delinquency referrals. However, when added into the regression model, only externalizing behaviors remained as a significant predictor of delinquency. Both externalizing behaviors and academic achievement have been cited as two of the strongest predictors of delinquency. Previous studies that have examined the relationship between many risk factors and

delinquency have found the connection between reading and delinquency to be mediated by additional risk factors including early externalizing behaviors (Maughan, Pickles, Hagell, Rutter, & Yule, 1996; Williams & McGee, 1994). One study that used structural equation modeling to investigate the associations between reading attainment and delinquency determined that the relationship was mediated by antisocial behaviors (Williams & McGee, 1994). The investigators used a longitudinal data sample of 698 children to examine the ability of reading and antisocial behavior measures at ages seven and nine to predict antisocial behaviors including delinquency at age 15. The model revealed that early antisocial behaviors, but not early reading, influenced delinquency at age 15. This effect of early antisocial behaviors was strongest for males, and also negatively affected reading.

Another longitudinal model that included both reading achievement and antisocial behavior also failed to find a direct link between reading and delinquent or criminal behaviors (Simonoff et al., 2004). In this study reading problems were found to be predictive of hyperactivity, but not conduct disorder. Conversely, IQ was predictive of conduct disorder, but not hyperactivity. Low IQ has consistently been cited as a risk factor for delinquency (Fergusson et al, 1995). However, in the current study no measures of intelligence were available for examination.

Promotive Factors

Evidence for a main or promotive effect was found for the nine hypothesized promotive/protective variables, accounting for an additional 4% of the variance in the number of delinquency referrals. These positive effects were found after controlling for race, gender, SES and the relationship of all seven risk factors and nine promotive factors

with the outcome variable. These results also held true for male and White students. However, no promotive effects were found for female and Black students. In addition, the amount of variance accounted for is fairly consistent with promotive effects from other studies (Gerard & Buehler, 2003). This finding indicates that, even after controlling for the substantial effects of multiple control and risk factors, positive assets—many of which can be systematically taught or enhanced—are significantly related to delinquency outcomes. Contrary to a priori hypotheses, after controlling for the relationship among the nine hypothesized promotive/protective assets, only parental acceptance involvement and locus of control remained as significant predictors in the regression analysis. However, in bivariate correlations, temperament ($r=-.17$, $p<.01$), parental strictness supervision ($r=-.15$, $p<.01$), and connection to school ($r=-.09$, $p<.01$) were also significantly related in the expected direction to number of delinquency referrals. A post hoc regression analysis using just the control variables and promotive variables (eliminating the effects of the risk variables) revealed similar results with only parental acceptance/involvement and locus of control as the significant predictors (see Appendix D). This analysis suggests that the lack of significance for many of the previously supported promotive factors may result from the stringent test of finding unique variance when predicting the number of referrals for nine hypothesized promotive factors. This conclusion is supported by the inter-correlation matrix of the nine promotive/protective factors, which reveals many significant relationships among the variables. Additionally, the composition of the promotive/protective risk sample ($n=564$) deviates enough from the original cohort composition that it may not be a valid representation of the actual factors that protect youth from delinquency.

Family Variables

Parental monitoring and supervision have been cited among the strongest predictors of juvenile delinquency and other behavior problems (Stouthamer-Loeber et al., 2002; Yoshikawa, 1994). Although the connection between parental strictness/supervision and delinquency was adequately supported through bivariate correlations, this relationship did not hold true after accounting for the influence of other related variables. In the current study, there were strong correlations between parental acceptance/involvement and both parental strictness/supervision and number of referrals. These connections may have led to insignificant findings for parental strictness/supervision in the regression model. However, lack of support for this finding in our regression should not minimize the importance of such constructs in decreasing delinquency. Parental autonomy support has been found to be a significant promotive factor in many studies of resilience; however, it has not been thoroughly examined in studies of delinquency. Parental autonomy support items indicate the amount of control parents have over their children and the amount of choices the children are provided in their lives. In the current study autonomy support was weakly correlated with the outcome ($r = -.06$, $p < .05$). This finding may suggest mixed results for parent autonomy support in protecting against delinquency. Although autonomy support may be protective for some individuals, it does not appear to strongly influence the outcome of delinquency.

Consistent with the literature on promotive factors for delinquency, the amount of parental acceptance/involvement was a strong predictor of delinquency, with students indicating higher levels of parental acceptance/involvement having fewer juvenile justice referrals. Parent educational involvement, indicating children who perceive their parents

to be involved in their educational process and school, was not significantly correlated with the outcome variable. However, parental educational involvement was significantly correlated with the other parenting variables as well as locus of control.

School Variables

Neither of the school variables investigated (connection to teacher, connection to school) were unique significant predictors of delinquency in the regression model. Additionally, only connection to school was significantly correlated with delinquency. The lack of predictive value for these two variables may have been related to our data source, one questionnaire given about the students' perceptions of school in fifth grade. It is highly probable, that students' views about their school and their teachers would change between elementary, middle, and high school. The strength of the relationship may have been greater if these variables had been assessed later in the students' education experience, closer to the time of delinquency initiation.

Individual Variables

Of the three individual variables examined (temperament, locus of control, and activity involvement), only locus of control remained a significant predictor in the regression analyses. Although locus of control has been examined in previous studies of risk and resilience (Werner, 1993), the current study is the first known investigation to find a promotive effect for having a more internal locus of control for delinquency. Students with a more internal locus of control may be more likely to take responsibility for their actions and to believe that they are in control of their lives. Additionally, these students were more likely to take personal responsibility not only for positive events but also negative events.

Although previous studies of resilience have found having a special hobby or talent valued by society to be promotive/protective (Masten et al., 1995, Werner, 1993), the current study found no such results for activity involvement in either bivariate correlations or multiple regression. One of the only studies specifically investigating the effects of extracurricular activities on delinquency actually found involvement in sports, hobbies, and organized clubs to be positively correlated with delinquency (Mahoney, 2000). The conclusion from the current study is that individuals who are likely to engage in delinquency will continue to engage regardless of activity involvement; however, those who do participate in extracurricular activities are no more likely to be referred for delinquency.

Our measure of temperament, indicating parent's perception of his/per child as likable and easy to manage at age five was not a significant predictor of delinquency in the regression model. This variable was, however, significantly correlated with the outcome variable as well as a number of other predictors. The overlap of variance between temperament and other predictor variables may have reduced its independent contribution to delinquency referrals. Although most previous studies investigating the relationship between delinquency and temperament have examined difficult temperament as a risk factor, the items available in this archival dataset led to examining easy temperament as a promotive factor. The failure to find promotive effects for temperament may have been in part due to the construct's configuration, with items assessing difficult temperament more suited to predicting juvenile delinquency. Additionally, a review examining risk factors for delinquency found mixed results in

regards to the effects of temperament and suggested that parental report may not be the best method to determine a child's temperament (Yoshikawa, 1994)

Protective Effects

With the exception of females, no protective effects were found for the hypothesized interactions in the current study. In the overall model, the five interactions examined failed to explain any additional variance above that accounted for by the control, risk, and promotive factors. One explanation for our failure to find significant protective interactions may have been our choice of using a variable-based model rather than a person-based model. Person-based models of resilience examine a group of individuals deemed to be "high risk" and determine factors that differentiate between those who fail and those who succeed. However, the current study sought to examine resilience in a variable-based model in order to determine the influence of individual risk and promotive/protective variables. This may have limited our ability to detect interactions.

Additionally, although there were 63 possible interactions (7 risk by 9 promotive), we chose to only examine five of these interactions. The interactions were selected prior to our examination of correlation statistics, which provided an indication of the relative strength of each variable. It is possible that other significant interactions exist in this sample that were not hypothesized prior to initial analyses. Other studies have examined protective effects by creating cumulative risk and promotive indices and examining the interaction of the two (Jessor et al., 1995). We attempted to replicate this process in the current study to determine if any overall protective effect would be found. To accomplish this analysis, risk and promotive variables were converted to z-scores and

aggregated to form an overall risk index and promotive index. A regression analysis was computed using control variables in Step 1, the risk index in Step 2, the promotive index in Step 3, and the interaction of the risk and promotive index in Step 4 (See Appendix E). Results of this analysis indicated significant effects for the control, risk, and promotive steps, but once again failed to find any additional variance accounted for by the protective step.

Another possible explanation for our failure to find protective effects may have been due to the composition of the sample containing complete data on all control, risk, and promotive factors. As previously reported, this sample had fewer Black, poor, and male students and had lower risk scores, higher promotive scores, and fewer delinquency referrals than those in the original sample. Our failure to find significant protective results with analyses on these individuals may have been additionally limited by range restriction on the predictor and outcome variables for this subset.

A protective effect was, however, found for females where two significant interaction effects were found. The first interaction indicated that, for females, acceptance involvement acts to reduce the number of delinquency referrals for individuals who come from families where parents are married continuously from birth to fifth grade, but not families who had a change in marital status or were never married between birth and grade five. This finding was actually contrary to the hypothesized interaction predicting a protective effect for students with marital status inconsistencies. However, the finding appears to be related more to range restriction than an actual protective effect for students without marital status risk. When examining scatter plots of parental acceptance involvement and delinquency referrals for those with and without

marital status risk, most scores do not appear to vary as a result of acceptance/involvement because the majority of females in this sample had no delinquency referrals. However, it appears as though a few outlying scores indicating higher numbers of delinquency referrals were more influential in determining the slope of the regression line for those with consistently married parents.

The second interaction examined the ability of parental educational involvement to decrease delinquency referrals for individuals with low reading scores in the third grade. This interaction worked in the hypothesized direction indicating that females with low third grade reading scores who perceived their parents as being more involved in their educational experience were less likely to have contact with the Florida Department of Juvenile Justice. However, this result should also be interpreted with caution, as 82% of these females had no contact with the Florida Department of Juvenile Justice.

Limitations

Although the longitudinal nature of the current study allowed for the examination of a wide variety of predictor variables from multiple information sources, there are also limitations built into this particular archival data set. Since this study was initially designed by and for school district administrators for analysis and program planning, the current researchers had no influence in the initial research design including sampling strategies, instrument selection, or data collection. Participants in this study initially included all students who were born in Pinellas County and enrolled in kindergarten in Pinellas County Schools in 1989. Predictor data utilized in the current study range between birth and 8th grade with reports from students, parents, and teachers. As previously demonstrated, students who remain with no missing data on all of the desired

risk variables differ demographically and in the severity of risk factors compared to the original sample. However, the differences in risk factors, although statistically significant, are not necessarily clinically significant. In general, students in the risk regression sample appear to be less at risk than those who did not have complete data, and thus had to be excluded from analyses. Two main factors are responsible for this decrease. Data on prenatal cigarette smoking, one of our most consistent significant risk factors, were derived from the 1989 parent survey. Therefore, in order for students to be included in analyses, they must have had a parent fill out a survey at home and return it to the school. It is possible that those parents who failed to return the surveys were from lower SES families and had children with more behavior problems. A second factor included the failure of the district to include special education students who were not in mainstream classes in data collection. Both of these factors may have led to a sample where many of the highest-risk individuals were not included. It is possible that the results of the risk regression analyses would look different, and perhaps be stronger had data been available for these excluded youth.

Exclusion of students due to attrition was a much larger problem for our promotive/protective regression sample. This sample included only students who had complete data on seven risk and nine promotive/protective variables—16 in all collected at six different time points. Given the high rates of mobility in this district, higher yet for those at greatest risk, this is a restrictive requirement. These students not only needed to remain in Pinellas County Schools between birth and 8th grade but also needed complete data recorded by teachers, parents, and the students themselves. Not surprisingly, students who remained were significantly less Black, male, and poor than the original

sample, indicating that many of the students at higher risk had either incomplete data sets or had moved out of the district prior to the eighth grade. Although limited significant results were found for promotive effects, and fewer for protective effects, it is likely that Type II errors were present. Due to the differences in the composition of this reduced subset of the original cohort, caution should be used when interpreting the results of the promotive/protective results both overall and by gender and race.

An additional problem in the current study concerns weaknesses in the measurement of constructs. Items selected for inclusion in the Omnibus dataset were often chosen by district personnel relatively unfamiliar with psychometric properties and issues, which compromised the validity and reliability of many of the constructs measured. This study attempted to ameliorate this problem by only including items with acceptable Cronbach's Alpha coefficients; however, some were not as high as desired which may have limited results. In addition, less than ideal proxies were sometimes used for constructs, such as using free and reduced lunch as a measure of income. Although this is frequently done and reported in the literature, it would have been preferable to have a direct measure of income. Similarly, we at times had to rely on face validity for certain variables, such as temperament, when the availability of more empirically supported measures from the literature would have been desirable. We were also limited to predictor variables selected in the initial study. Hence, many individual, family, school and peer risks and assets related to delinquency, such as substance abuse, neighborhood characteristics, parental characteristics, and affiliation with delinquent peers, were not available for examination in the current study

Implications For Policy, Practice, and Research

Despite the noted limitations, this study yielded many important implications for delinquency prevention. First, the identification of factors that place individuals at increased risk for delinquency can assist in the identification of individuals in need of early intervention efforts. This procedure fits in line with the Florida Department of Juvenile Justice's priority of identifying and providing early intervention strategies to high-risk juveniles before the onset of a first offense. The risk variables assessed in this study required little effort by district personnel to collect, indicating a low cost-benefit ratio for implementing an early identification system. Additionally, these risk factors were all assessed prior to or during the elementary school years. This type of early identification, although less accurate than later identification, enables time for reducing problem behaviors before they have additional time to strengthen and spread.

Prevention efforts should focus on both reducing risk factors that are amenable to change and enhancing promotive factors that may decrease the rates of delinquency. For example, programs that facilitate effective parenting and parent-child relationships are among the most positive and successful promoting strategies for all children regardless of their risk status (Webster-Stratton & Taylor, 2001). Future studies should attempt to identify effective ways to engage parents in school relations early on to create school-community partnerships to improve children's academic, social, and emotional learning.

The current study represents only one attempt to identify risk and promotive/protective variables for juvenile delinquency. The results of this study can be used to both support other findings and provide direction for future study. Additionally,

given the wealth of information collected from diverse studies over the past 10 years, it seems timely for a systematic review to be conducted on risk and promotive/protective factors for delinquency. This may allow for a more accurate picture of both risk and promotive/protective factors that have been supported in a variety of contexts. As revealed by the complex relationships among predictor variables and the outcome variable, the use of structural equation modeling techniques may be useful to identify specific mediator and moderator pathways to delinquency. Although the current study attempted to control for the influence of related variables by both examining bivariate correlations and hierarchical multiple regression analyses, the implementation of modeling techniques may allow for the illustration of more complex pathways to delinquency.

The collection of a longitudinal dataset is a timely and costly venture. We were fortunate in the current study to have access to a unique district-wide dataset spanning birth to graduation. Although it would have been preferable to have data available that better represented the range of possible risk and promotive variables for delinquency, this was not the purpose of the initial dataset. However, such datasets are extremely rare and expensive to create. Developing a new large-scale longitudinal dataset such as the one in the current study would take more than 12 years to produce results. An alternative approach to creating a new longitudinal study may be to conduct retrospective analyses on individuals who have had involvement in the juvenile delinquency system. This strategy could serve to not only identify risk factors, but also identify protective factors by comparing this group to individuals of a similar demographic and risk background who do not have delinquency involvement. Although such a study is no small venture, it

is certainly less so than the creation of a new longitudinal data set, which must also deal with problem of systematic attrition.

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Appendices

Appendix A: Risk Factors and Data Sources

Risk Factors and Data Sources

Pinellas County Birth Records

Birth Weight (grams)

Apgar Score-1 minute (Scale 1-10)

Mother's Education Level (years)

1989 Parent Survey

Tobacco Use:

How many packs of cigarettes a day did the mother smoke while pregnant?

- Never Smoked ½ or less ½ -1 1-1½
 1½ - 2 2-3 3 or more

Marital Status:

Darken in the circle if the statement is true.

- Mother was married when child was born

Marital Status of person completing this form

- Married
 Widowed
 Separated
 Divorced
 Never Married

(Assessed in 1989-1990, 1991-1992, 1993-1994, and 1994-1995 parent surveys)

1992-1993 3rd grade Pinellas County School District Records

CTBS Reading Standard Score

1994-1995 5th grade Teacher surveys

Externalizing Behaviors:

Does this student get into fights at school?

- never not very often often very often

Does this student threaten of bully classmates?

- never not very often often very often

This student shows disrespect to adults

- strongly disagree disagree agree strongly agree

This student is unable to control his/her temper

- strongly disagree disagree agree strongly agree
-

Appendix B: Promotive/Protective Factors and Data Sources

Promotive/Protective Factors and Data Sources

1989 Parent Survey

Temperament

Darken in the circle if the statement is true.

- Your child likes to please his/her parents
- Your child is easy to manage
- Your child does what he is told to do

1995-1996 Student Survey

Connection to Teacher

Some teachers choose me as favorite students

(SD, D, DK, A, SA,)

My teachers care about me

(SD, D, DK, A, SA,)

I feel that I can go to my teachers for advice and help with school work

(SD, D, DK, A, SA,)

I feel that I can go to my teachers for advice and help with non-school work.

(SD, D, DK, A, SA,)

Most teachers like me and my friends

(SD, D, DK, A, SA,)

My teachers often get to know me well

(SD, D, DK, A, SA,)

I care what most teachers think of me

(SD, D, DK, A, SA,)

Connection to School

Students get along at this school

(SD, D, DK, A, SA,)

I feel like I'm learning a lot at school

(SD, D, DK, A, SA,)

Discipline is fair at school

(SD, D, DK, A, SA,)

I get a lot of encouragement at school

(SD, D, DK, A, SA,)

I'm learning important things at school

(SD, D, DK, A, SA,)

I like school

(SD, D, DK, A, SA,)

I feel a sense of school spirit

(SD, D, A, SA, DK)

Appendix B: Promotive/Protective Factors and Data Sources (continued)

Student Involvement in Extra Curricular Activities

How many hours a week do you usually spend doing the following:

(1) Attendance in services or programs at church/synagogue

- None 1 -2 3-4
5-6 7 or more

(2) Participation in sports outside of school

- None 1 -2 3-4
5-6 7 or more

(3) Participation in clubs at school after school hours

- None 1 -2 3-4
5-6 7 or more

(4) Participation in clubs outside of school

- None 1 -2 3-4
5-6 7 or more

(5) Participation in dance, choir, band, painting, music, drawing, or other artistic activities outside school

- None 1 -2 3-4
5-6 7 or more

1996-1997 Student Survey

Parental Educational Involvement

My parents/guardians attend school events

(always, sometimes, never)

My parents/guardians know at least one of my teachers

(always, sometimes, never)

My parents/guardians attend PTA meetings

(always, sometimes, never)

“My parents/guardians volunteer at my school

(always, sometimes, never)

“My parents/guardians help me with my homework

(always, sometimes, never)

My parents/guardians ask me about my homework

(always, sometimes, never)

My parents/guardians check my homework

(always, sometimes, never)

Appendix B: Promotive/Protective Factors and Data Sources (continued)

1997-1998 Student Survey

Locus of Control

If a teacher passes you to the next grade, would it probably be

- Because she liked you
- Because of the work you did

When you do well on a test at school, is it more likely to be

- Because you studied for it, or
- Because the test was especially easy

When you have trouble understanding something in school, is it usually

- Because the teacher didn't explain it clearly
- Because you didn't listen carefully

When you read a story and can't remember much of it is it usually

- Because the story wasn't written well, or
- Because you weren't interested in the story

Suppose your parents say you are doing well in school, is this likely to happen

- Because your school work is good, or
- Because they are in a good mood

Suppose you did better than usual in a subject at school. Would it probably happen

- Because you tried harder, or
- Because someone helped you

When you lose at a game of cards or checkers, does it happen

- Because the other player is good at the game, or
- Because you don't play well

Suppose a person doesn't think you are very bright or clever

- Can you make him change his mind if you try to, or
- Are there people who will think you're not very bright no matter what you do

If you solve a puzzle quickly, is it

- Because it wasn't a very hard puzzle, or
- Because you worked on it carefully

If a boy or girl tells you that you are dumb, is it more likely that they say that

- Because they are mad at you, or
- Because what you did really wasn't very bright

Suppose you study to become a teacher, scientist, or doctor, and you fail, do you think this would happen

- Because you didn't work hard enough, or
- Because you needed some help, and other people didn't give it to you

When you learn something quickly in school, is it usually

- Because you paid close attention, or
- Because the teacher explained it clearly

If a teacher says to you, "Your work is fine," is it

- Something teachers usually say to encourage pupils
- Because you did a good job

Appendix B: Promotive/Protective Factors and Data Sources (continued)

When you find it hard to work arithmetic or math problems at school, is it

- Because you didn't study well enough before you tried them, or
- Because the teacher gave problems that were too hard

When you forget something you heard in class, is it

- Because the teacher didn't explain it very well, or
- Because you didn't try very hard to remember

Suppose you weren't sure about the answer to a question your teacher asked you, but your answer turned out to be right. Is it likely to happen

- Because she wasn't particular as usual, or
- Because you gave the best answer you could think of

When you read a story and remember most of it, is it usually

- Because you were interested in the story, or
- Because the story was written well

If a teacher passes you to the next grade, would it probably be

- Because she liked you
- Because of the work you did

If your parents tell you you're acting silly and not thinking clearly, is it more likely to be

- Because of something you did, or
- Because they happen to feel cranky

When you don't do well on a test at school, is it

- Because the test was especially hard, or
- Because you didn't study for it

When you win at a game of cards or checkers does it happen

- Because you play real well, or
- Because the other person doesn't play well?

If people think you are bright and clever, is it

- Because they happen to like you, or
- Because you usually act that way

If a teacher didn't pass you to the next grade, would it probably be

- Because she "had it in for you," or
- Because your school work wasn't good enough

Suppose you don't do as well as usual in a subject at school. Would this probably happen

- Because you weren't as careful as usual, or
- Because somebody bothered you and kept you from working

If a boy or girl tells you that you are bright, is it usually

- Because you thought up a good idea, or
- Because they like you

Suppose you became a famous teacher, scientist, or doctor. Do you think this would happen

- Because other people helped you when you needed it, or
- Because you worked very hard

Appendix B: Promotive/Protective Factors and Data Sources (continued)

Suppose your parents say you aren't doing well in your schoolwork. Is this more likely to happen

- Because you work isn't very good, or
- Because they are feeling cranky

Suppose you are showing a friend how to play a game and he has trouble with it. Would that happen

- Because he wasn't able to understand how to play, or
- Because you couldn't explain it well

When you find it easy to work on arithmetic or math problems at school, is it usually

- Because the teacher gave you especially easy math problems, or
- Because you studied your book well before you tried them

When you remember something you heard in class, is it usually

- Because you tried hard to remember, or
- Because the teacher explained it well

If you can't work a puzzle, is it more likely to happen

- Because you are not especially good at working puzzles, or
- Because the instructions weren't written clearly enough

If your parents tell you that you are bright or clever, is it more likely

- Because they are feeling good, or
- Because of something you did

Suppose you are explaining how to play a game to a friend and he learns quickly. Would that happen more often

- Because you explain it well, or
- Because he was able to understand it

Suppose you're not sure about the answer to a question your teacher asks you and the answer you give turns out to be wrong. Is it likely to happen

- Because she was more particular than usual, or
- Because you answered too quickly

If a teacher says to you, "Try to do better," would it be

- Because this is something she might say to get pupils to try harder, or
- Because your work wasn't as good as usual

Appendix B: Promotive/Protective Factors and Data Sources (continued)

Parental Psychological Autonomy

My parents say that you shouldn't argue with adults.

(SD, D, A, SA)

My parents say that you should give in on arguments rather than make people angry.

(SD, D, A, SA)

When I get a poor grade in school, my parents make my life miserable.

(SD, D, A, SA)

My parents tell me that their ideas are correct and that I should not question them.

(SD, D, A, SA)

Whenever I argue with my parents, they say things like, "You'll know better when you grow up."

(SD, D, A, SA)

My parents let me make my own plans for things I want to do.

(SD, D, A, SA)

My parents act coldly and unfriendly if I do something they don't like.

(SD, D, A, SA)

When I get a poor grade in school, my parents make me feel guilty.

(SD, D, A, SA)

My parents won't let me do things with them when I do something they don't like.

(SD, D, A, SA)

Parental Acceptance/Involvement

I can count on my parents to help me out, if I have some kind of problem.

(SD, D, A, SA)

My parents keep pushing me to do my best in whatever I do.

(SD, D, A, SA)

My parents keep pushing me to think independently.

(SD, D, A, SA)

My parents help me with my schoolwork if there is something I don't understand.

(SD, D, A, SA)

When my parents want me to do something, they explain why.

(SD, D, A, SA)

When I get a poor grade in school, my parents encourage me to try harder.

(SD, D, A, SA)

My parents know who my friends are.

(SD, D, A, SA)

My parents spend time just talking with me.

(SD, D, A, SA)

My family does fun things together.

(SD, D, A, SA)

Appendix B: Promotive/Protective Factors and Data Sources (continued)

Parental Strictness/Supervision

In a typical week, what is the latest you can stay out on SCHOOL NIGHTS (Monday-Thursday)?

- | | | |
|--------------------------|--------------------|--------------------|
| 1 – I am not allowed out | 2 – Before 8:00 | 3 – 8:00 to 8:59 |
| 4 – 9:00 to 9:59 | 5 – 10:00 to 10:59 | 6 – 11:00 or later |
| 7 – As late as I want | | |

In a typical week, what is the latest you can stay out on FRIDAY OR SATURDAY NIGHT?

- | | | |
|--------------------------|--------------------|--------------------|
| 1 – I am not allowed out | 2 – Before 8:00 | 3 – 8:00 to 8:59 |
| 4 – 9:00 to 9:59 | 5 – 10:00 to 10:59 | 6 – 11:00 or later |
| 7 – As late as I want | | |

How much do you parents TRY to know:

Where you go at night?

- | | | |
|---------------|------------------|---------------|
| 1 – Don't Try | 2 – Try a Little | 3 – Try a Lot |
|---------------|------------------|---------------|

What you do with your free time

- | | | |
|---------------|------------------|---------------|
| 1 – Don't Try | 2 – Try a Little | 3 – Try a Lot |
|---------------|------------------|---------------|

Where you are most afternoons after school?

- | | | |
|---------------|------------------|---------------|
| 1 – Don't Try | 2 – Try a Little | 3 – Try a Lot |
|---------------|------------------|---------------|

How much do you parents REALLY know:

Where you go at night?

- | | | |
|----------------|-------------------|----------------|
| 1 – Don't Know | 2 – Know a Little | 3 – Know a Lot |
|----------------|-------------------|----------------|

What you do with your free time

- | | | |
|----------------|-------------------|----------------|
| 1 – Don't Know | 2 – Know a Little | 3 – Know a Lot |
|----------------|-------------------|----------------|

Where you are most afternoons after school?

- | | | |
|----------------|-------------------|----------------|
| 1 – Don't Know | 2 – Know a Little | 3 – Know a Lot |
|----------------|-------------------|----------------|

Appendix C: Table of Step 2 Risk Factors on the Total Number of Referrals for the Promotive/Protective Model

Step 2 Risk Factors on Total Number of Referrals for Promotive/Protective Model

Step/ Variable	β	β^1	R	R ²	ΔR^2
All (N=564)					
1. Control			.31	.09	.09**
Gender	.08*	.16**			
Race	.09*	.13**			
SES	.07	.19**			
2. Risk			.44	.19	.10**
Externalizing Behavior	.28**				
Prenatal Smoking	.08*				
APGAR Score	-.02				
Mother's Education	-.09*				
Birth weight	.00				
Reading Score	-.01				
Marital Status	.05				

β = Beta at final Step. β^1 = Beta at first Step.

*p<.05 **p<.01. Gender= coded as 0) Female, 1) Male Race= coded as 0) White, 1) Black; SES coded as 0) regular lunch 1) free or reduced lunch

Appendix D: Table of Step 2 Promotive/Protective Factors on the Total Number of Delinquency Referrals

Step 2 Promotive/Protective Factors on Total Number of Delinquency Referrals

Step/ Variable	β	β^1	R	R ²	ΔR^2
All (N=564)					
1. Control			.31	.09	.09**
Gender	.12**	.16**			
Race	.13**	.13**			
SES	.18**	.19**			
2. Promotive			.38	.15	.05**
Temperament	-.01				
Parental Psychological Autonomy	.02				
Parental Acceptance/Involvement	-.11*				
Parental Strictness/Supervision	-.09				
Activity Involvement	.05				
Connection to Teacher	.04				
Connection to School	-.07				
Locus of Control	-.11**				
Parental Education Involvement	-.01				

β = Beta at final Step. β^1 = Beta at first Step.

* $p < .05$ ** $p < .01$. Gender= coded as 0) Female, 1) Male; Race= coded as 0) White, 1) Black; SES coded as 0) regular lunch 1) free or reduced lunch

Appendix E: Table of Standardized Cumulative Risk, Promotive, and Protective Effects

Standardized Cumulative Risk, Promotive, and Protective Effects					
Step/ Variable	β	β^1	R	R ²	ΔR^2
All (N=564)					
1. Control			.31	.09	.09**
Gender	.12**	.15**			
Race	.12*	.13**			
SES	.09	.19**			
2. Cumulative Standardized Risk Score	-.22**		.38	.14	.05**
3 Cumulative Standardized Promotive Score	-.12**		.39	.15	.01*
4. Risk X Promotive Cumulative Scores Interaction	.00		.39	.15	.00

β = Beta at final Step. β^1 = Beta at first Step.

*p<.05 **p<.01. Gender= coded as 0) Female, 1); Male Race= coded as 0) White, 1) Black; SES coded as 0) regular lunch 1) free or reduced lunch