



Published in final edited form as:

*J Child Adolesc Psychiatr Nurs.* 2004 ; 17(3): 93–103.

## Childhood Externalizing Behavior: Theory and Implications

Jianghong Liu, PhD, RN

Postdoctoral Fellow, Social Science Research Institute, University of Southern California, Los Angeles, CA.

### Abstract

**TOPIC**—Childhood externalizing behavior

**PURPOSE**—To analyze the construct of externalizing behavior (aggression, delinquency, and hyperactivity), illustrate the biosocial model of childhood externalizing, and draw clinical implications for nursing research and practice.

**SOURCES**—A review of the literature based on psychological, psychiatric, and nursing journals.

**CONCLUSIONS**—A better understanding of childhood externalizing behavior problems and the risk factors underlying them are essential to prevent them. The employment of an integrative biosocial perspective is argued to be important in understanding this behavior.

### Search terms

Aggression; antisocial behavior; biosocial interaction; childhood externalizing behavior; delinquency; hyperactivity

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This article is concerned with childhood externalizing behavior, a behavioral problem that is a major risk factor for later juvenile delinquency, adult crime, and violence (Betz, 1995; Farrington, 1989; Moffitt, 1993). Childhood externalizing behavior and juvenile delinquency are being increasingly viewed as a public health problem (Campbell, Harris, & Lee, 1995; Hann, 2002). In 1996, law enforcement agencies arrested 2.9 million juveniles (Olds et al., 1998). Homicide is the second leading cause of death among 15- to 24-year-olds in the United States and is the leading cause of death for young African-American males and females (National Center for Injury Prevention and Control, 1996). Consequently, violence prevention has become one of the most pressing issues facing our society today (Campbell et al.; Gournay, 2001; Hann; Parker, McFarlane, Soeken, Silva, & Reel, 1999).

Thus, to understand childhood externalizing behavior is critically important for nursing professionals who specialize in child and adolescent psychiatric and mental health nursing. The purpose of this article is to describe the construct of childhood externalizing behavior problems in which the concepts of aggression, delinquency, and hyperactivity are outlined. Following this, the biosocial model of childhood externalizing behavior is illustrated and identified as the conceptual framework for biosocially based, childhood externalizing behavior research. Finally, clinical implication is briefly discussed.

A well-known distinction in the field of child psychology and psychiatry is the distinction between “externalizing” and “internalizing” disorders (Achenbach, 1978). The construct of externalizing behavior problems refers to a grouping of behavior problems that are manifested in children’s outward behavior and reflect the child negatively acting on the *external* environment (Campbell, Shaw, & Gilliom, 2000; Eisenberg et al., 2001). In the research

literature, these externalizing disorders consist of disruptive, hyperactive, and aggressive behaviors (Hinshaw, 1987). In the context of this paper, three key behavior problems similarly make up this construct: aggression, delinquency, and hyperactivity. Other terms used to describe externalizing behavior problems include “conduct problems,” “antisocial,” and “undercontrolled” (Hinshaw).

Studies show that childhood aggression is a strong predictor of adult crime and violence.

In contrast, children may develop *internalizing* behavior problems such as withdrawn, anxious, inhibited, and depressed behaviors, problems that more centrally affect the child’s internal psychological environment rather than the external world. Other terms for this cluster of behavior problems include “neurotic” and “overcontrolled” (Campbell et al., 2000; Eisenberg et al., 2001; Hinshaw, 1987). Inevitably, this dichotomy is neither perfect nor complete. For example, a child’s internalizing behavior problems can have a negative impact on others, including siblings, parents, peers, and teachers. Similarly, children with externalizing behavior problems not only may negatively affect their outside world, but also may be psychologically suffering internally. In fact, there is significant and substantial co-morbidity between externalizing and internalizing behavior problems (Hinshaw). In other words, children who are aggressive also may experience anxiety and, conversely, depressed children also may exhibit conduct problems.

The terms “externalizing behavior problems” and “antisocial” are almost synonymous. At the same time, distinctions are sometimes drawn between these constructs. For example, Shaw and Winslow (1997) state, “in most cases we use the term *externalizing behavior* rather than *antisocial behavior* to discuss the less severe disruptive and destructive behavior of children” (pp. 148–149). It is clear, therefore, that some researchers view externalizing behavior to represent a less severe form of antisocial behavior, especially in young children. In addition, the externalizing construct includes hyperactivity, and there are some hyperactive children who are *not* antisocial, again illustrating the difference between the terms “externalizing” and “antisocial.” The externalization construct also would include the *DSM-IV* disorder of oppositional defiant disorder (American Psychiatric Association [APA], 1994), which involves oppositional behavior (negative, hostile, and defiant behavior) especially shown by young children to their parents and teachers; Hinshaw (1987) has argued that it is uncertain whether this constitutes a valid category. Again, these early behavior problems are generally less serious than aggression and delinquency and are viewed as the forerunner of more serious externalizing disorders such as conduct disorder.

Despite these problems of definition and co-morbidity, there is nevertheless utility to the separation of the constructs of externalizing and internalizing behavior problems. Children with the externalizing behavior problems of conduct disorder are more likely to grow up to become delinquent as adolescents, and criminal and violent as adults (Farrington, 1997). Hyperactive children also are more likely to grow up to become criminal, though not all hyperactive children have this outcome (Mannuzza, Klein, Konig, & Giampino, 1989). Similarly, children with internalizing behavior problems are more likely to grow up to become depressed and anxious (APA, 1994).

## The Concept of Externalizing Behavior

### Aggression

Generally speaking, aggression is one component of conduct disorder; it consists of physical or verbal behaviors that harm or threaten to harm others, including children, adults, and animals (APA, 1994). In addition, aggression may be either appropriate and self-protective or destructive to the self and others (Ferris & Grisso, 1996). It is an important childhood concept

because studies show that childhood aggression is a strong predictor of adult crime and violence (Farrington, 2001; Moffitt, 1993). Moreover, Farrington found that early onset of aggressive and antisocial behavior was the strongest predictor of later convictions. Generally speaking, aggression is found to be more common in boys than in girls. While boys often engage in physical aggression, girls are more likely to exhibit what has been termed “relational aggression,” such as exclusion of others from their social group, and slander (Hadley, 2003).

There are several different types of aggression. Theoretical perspectives on aggression suggest that functionally distinct subtypes of aggression exist (Dodge & Schwartz, 1997; Feshbach, 1971). It is important to consider the multidimensional nature of aggression because it is believed that different stimuli combine with different types of physiological and mental processes to create distinct forms of aggression. Although different classification systems for aggression have been proposed, these typologies tend to overlap somewhat, with each system having a slightly different emphasis.

One influential and prominent model for subtyping aggression is the distinction between instrumental and hostile aggression (Feshbach, 1970). Hostile aggression can be viewed as a response to physical or verbal aggression initiated by others with violence that is relatively uncontrolled and emotionally charged, and which causes injury or pain on the victim with little or no advantage to the aggressor. This form of aggression is called “affective,” “reactive,” “defensive,” “impulsive,” or “hot-blooded” aggression (Atkins & Stoff, 1993). In contrast, instrumental aggression is more “predatory,” “instrumental,” “proactive,” “attack,” or “cold-blooded” in nature. This type of aggression is characterized as controlled, purposeful aggression lacking in emotion that is used to achieve a desired goal, including the domination and control of others (Atkins & Stoff; Dodge, 1991; Feshbach, 1970; Meloy, 1988). Meloy also views aggression in humans as either predominantly affective or predatory. Similarly, Dodge categorizes childhood aggression as either proactive or reactive, while admitting that very few aggressive acts are purely reactive or proactive in nature. In the *DSM-IV* (APA, 1994), reference is made to “intermittent explosive disorder,” a form of clinical aggression in which the individual for an intermittent, short period loses control and becomes inordinately aggressive.

Increasingly, a multifactorial integrative approach that recognizes the role of both biological and social factors is being taken to understand aggression. In all likelihood, there are both genetic/biological and environmental contributions toward aggressive behavior. In 1,500 pairs of Swedish and British twins, researchers found that aggressive and nonaggressive antisocial behavior have both environmental and hereditary influences (Eley, Lichenstein, & Stevenson, 1999). Research on the causes of aggression includes work on social learning, imitation, family violence, child abuse, neglect, school aggression, TV violence, malnutrition, structural and functional brain abnormalities, hormones (e.g., testosterone), and neurotransmitters (e.g., serotonin) (Campbell, Woods, Chouaf, & Parker, 2000; Feshbach & Feshbach, 1998; Fishbein, 2001; Huesmann, 1997; Liu, Raine, Venables, & Mednick, in press; Little & Kantor, 2002; Lutenbacher, 2000; Preski & Shelton, 2001; Raine, 2002). This research is slowly beginning to emphasize the more dynamic, intricate, and complex roles played by risk factors in shaping the complex construct of aggression and antisocial behavior in a developmental context (Cicchetti & Lynch, 1993; Susman, 1993). While there are numerous factors that contribute to the development of childhood aggression, they generally can be categorized into two main types: biological and psychosocial. The integration of both of these types is the key point of the biosocial interaction approach.

## Delinquency

Delinquency is a broad and heterogenous concept. Farrington (1987) has argued that it reflects diverse antisocial acts such as theft, burglary, robbery, vandalism, drug use, and violence.

Technically, the term “juvenile delinquency” is a legal concept that involves juveniles breaking the law. On the other hand, most delinquent acts are not detected, and consequently the more general term “delinquency” is almost synonymous with antisocial behavior. In this article, delinquency is specifically used to reflect the type of antisocial behaviors that are reflected in the Child Behavior Checklist (CBCL) (Achenbach, 1991; Achenbach & Edelbrock, 1983), such as lying, cheating, stealing, and committing antisocial acts with bad companions.

Importantly, delinquency as conceptualized here specifically refers to forms of antisocial behavior that do not include violent acts. Such acts are instead captured by the aggression concept outlined earlier. This separation between aggressive and nonaggressive forms of antisocial behavior is similar to Quay’s concepts of conduct disorder and socialized aggression (Quay, 1983, 1993). As measured by Quay’s Revised Behavior Problem Checklist, conduct disorder includes aggressive forms of antisocial behavior such as fighting, cruelty, and bullying. The subscale of socialized aggression does not contain any aggression items, but instead assesses behaviors such as lying, cheating, and stealing, which are frequently carried out in the company of other delinquent boys. As with aggression, boys are found to be more involved than girls.

This separation between aggressive and nonaggressive forms of antisocial behavior is perhaps questionable. Children who score high on aggression scales also score high on measures of nonaggressive forms of antisocial behavior, and vice versa. In addition, there has been relatively little work on what factors are specific to aggressive forms of antisocial behavior and, conversely, factors that are specific to nonaggressive forms of antisocial behavior. Nevertheless, both delinquency and aggression are central to the construct of externalizing behavior problems. Psychosocial and environmental factors have been strongly implicated in the etiology of both delinquency and aggression. Some researchers have proposed that both delinquent and aggressive behavior are learned (Huesmann, 1997; Shahinfar, Kupersmidt, & Matza, 2001). For example, Moise and Huesmann (1996) found an association between violent television viewing in the first year of the study and aggression 2 years later for girls ages 6 to 11 years. Furthermore, research has found that ethnic bias, ethnic conflict, and prejudice contribute to aggression at the elementary, middle, and high school levels (Feshbach & Feshbach, 1998), and that empathy training in school could help bring about more positive social behaviors and a more positive self-evaluation in aggressive children (Feshbach & Feshbach, 1982).

Another important influence on both delinquency and aggression is exposure to physical and sexual abuse (Fogel & Belyea, 2001; Widom, 1997). Others have argued for the importance of transactional influences on antisocial behavior involving a complex interplay among parental stress, parental responsiveness, discipline practices, and infant temperament (Shaw & Winslow, 1997).

Genetic influences also have been implicated in non-violent forms of antisocial and criminal behavior. Twin studies (Rowe, 1983) and adoption/cross-fostering studies (Hutchings & Mednick, 1975) have shown that antisocial and criminal behavior are in part genetically determined. In their adoptee study, Mednick, Gabrielli, and Hutchings (1984) assessed court convictions of 14,427 adoptees and whether their biological and adoptive parents had criminal histories. Results showed a significant relationship between biological parents’ criminal convictions and criminal convictions in their adopted-away children. That is, those whose biological parents were criminal were more likely to commit crimes themselves as adults. In addition, the more crimes the biological parent had committed, the higher the rate of criminality in the adopted-away offspring. Surprisingly, in this and at least two other adoption studies, no evidence was found for heritability of violent offending. This suggests that while violent and

nonviolent forms of antisocial behavior have much in common, they may differ in that heritable influences may affect the latter, but not the former.

## Hyperactivity

Hinshaw (1987) has argued that the term “hyperactivity” is one of the most confusing terms in psychopathology. The confusion arises because it is a term that really refers to two types of problems. The first type is an excess of motor activity or restlessness, while the second type involves attention deficits, particularly with respect to the child being unable to sustain and modulate his/her attention in a controlled setting such as the classroom. Reflecting this confusing mix of two basic problems, *DSM-IV* uses the term “attention-deficit/hyperactivity disorder” (APA, 1994). Although this is one disorder, children can meet criteria for it *either* by having symptoms of inattention (e.g., does not listen, problems sustaining attention, easily distracted) or by having symptoms of hyperactivity-impulsivity (e.g., fights, often interrupts). In an attempt to place some order on this confusion, *DSM-IV* defines three subtypes of attention-deficit/hyperactivity disorder: (a) combined type, (b) predominantly inattentive type, and (c) predominantly hyperactive-impulsive type. In this article, the general term “hyperactivity” will be used as shorthand to describe both attention and hyperactive forms of this disorder.

Like aggression and delinquency, hyperactivity is found to be more common in boys than girls and is thought to affect between 3% and 5% of the school-age population (APA, 1994; Hinshaw, 1987). Although parents often notice the start of this problem in toddlers, the disorder is usually diagnosed when the child is in elementary school. After this time the disorder is usually stable throughout adolescence; symptoms tend to reduce in severity by late adolescence and early adulthood, but problems do persist into adulthood for some children. As mentioned above, hyperactive children have an increased likelihood of becoming criminal in adulthood (Mannuzza et al., 1989).

The concept of hyperactivity has become increasingly important in attempting to understand which children are likely to not outgrow their problems, but are instead likely to remain troublesome to society in adulthood. Children with both hyperactivity and conduct problems are the most seriously impaired children. Of children with hyperactivity, the subgroup that also has conduct disorder has the worst social adjustment in later life (Barkley, Fischer, Edelbrock, & Smallish, 1990). In particular, an important question concerns which children may grow up to become psychopaths, a severe type of antisocial behavior that is characterized by lack of remorse and guilt, blunted affect, impulsivity, and irresponsible behavior. Lynam (1998) has argued that children with both conduct problems and problems with hyperactivity, impulsivity, and attention are most likely to be what he terms “fledgling psychopaths.” In support of this argument, he found that boys with both these externalizing problems most closely resemble psychopathic offenders on neuropsychological measures. Because the broad construct of externalizing behavior contains both hyperactivity and conduct problems, those children scoring high on this externalizing construct may be at risk for developing adult psychopathy.

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It has long been known that hyperactivity is predictive of later antisocial behavior (Lilienfeld & Waldman, 1990). *DSM-IV* comments, “A substantial proportion of children referred to clinics with Attention Deficit/Hyper-active Disorder also have Oppositional Defiant Disorder or Conduct Disorder” (APA, 1994, p. 81). Follow-up studies of young children with hyperactivity show they have higher rates of conduct problems in later childhood and adolescence (Mannuzza, Klein, & Addalli, 1991; Barkley et al., 1990). In an early study, Satterfield, Hoppe, and Schell (1982) showed that 58% of hyperactive children were arrested



in adulthood compared with 11% in a control group. In a prospective follow-up of 103 hyperactive children ages 6 to 12 years, Mannuzza et al. (1989) showed that rates of arrest for criminal offenses were 39% compared with 20% for matched controls, a statistically significant difference. They replicated this finding 2 years later (Mannuzza et al., 1991) in an independent sample of 94 hyperactive boys who showed a rate of 32% for antisocial disorders in adulthood compared with 8% in controls.

A detailed review of longitudinal, family, and adoption studies also show that hyperactive children are more likely to develop adult antisocial behavior problems (Lilienfeld & Waldman, 1990). It seems clear that conduct disorder and hyperactivity are closely linked. Indeed, they are so closely linked that problems are created in drawing clear conclusions. Lilienfeld and Waldman have argued that because so many hyperactive children also have conduct disorder, the claim that hyperactivity itself is associated with adult antisocial behavior may not be true. The link instead may be mediated by the comorbid condition of childhood conduct disorder.

## Biosocial Interaction Model

Because of its significant consequence, childhood externalizing behavior requires considerable further study. One important question to which we have few answers concerns the social risk factors for externalizing behavior interaction with biological risk factors, and what are the causal factors underlying this problem. In this context, a broad biosocial model of externalizing behavior, a modification of the biosocial model of violence first proposed by Raine, Brennan, Farrington, and Mednick (1997) acts as the conceptual framework for guiding studying childhood externalizing behavior. The modified model is illustrated in Figure 1. The original model had adult violence as its outcome. The model discussed here has childhood externalizing behavior as the outcome variable, and the emphasis is focused on the analysis of the model.

### Overview of the Model

Figure 1 outlines the conceptual model for studying childhood externalizing behavior. This relatively simple model indicates the relationship between predictors (top) and outcome (bottom). Psychosocial and biological risk factors during the pre/perinatal period are viewed as predictors of the outcome—childhood externalizing behavior. Psychosocial factors by themselves—and biological risk factors by themselves—can give rise directly to externalizing behavior. Furthermore, there is a reciprocal relationship between biological risk factors and psychological risk factors, which suggests that some risk factors could be influenced by both biological risk factors and psychosocial risk factors. The model also includes mediating processes that account for the relationship between predictors and the outcome variable, and moderator processes that may disrupt or enhance the interaction relationship.

### Early Biological Risk Factors

Biological risk factors make up the first component of the model. During the pre/perinatal period, these include both genetic and maternal pathophysiological factors that could impede fetal growth and development. Examples of such factors include maternal malnutrition, illness during pregnancy, smoking, using drugs and alcohol during pregnancy, a genetic predisposition to externalizing behavior from both the mother and father, and birth complications. In theory, of particular importance are factors that affect fetal *neural* maldevelopment, such as fetal alcohol syndrome, which damages regions of the brain including the corpus callosum (Stoff, Breiling, & Maser, 1997). For example, delivery complications may directly injure the newborn's central nervous system. Smoking during pregnancy also is believed to directly affect structures in the central nervous system (Brennan, Grekin, & Mednick, 1999), thus leading to enhanced externalizing behavior in the offspring (Orlebeke, Knol, & Verhulst, 1997).

## Psychosocial Risk Factors

The second component of the model consists of psychosocial risk factors. By the nature of the term, these are the risk factors during early childhood that are psychological and social in nature. More particularly, they are risk factors—that is, factors hypothesized to be associated with increased risk for a negative outcome. Examples consist of poverty, high psychosocial stress, negative attitude to the pregnancy, teenage pregnancy, and psychiatric factors such as drug/alcohol abuse. Furthermore, they can be viewed as any factor that is not biological. However, the etiology of some risk factors is complex and it is possible that both genetic and environment may contribute to social risk factors (or that social risk factors contribute to biological risk factors). For example, drug/alcohol abuse is generally viewed as a social behavior problem (Curran, White, & Hansell, 2000), but it also could be argued that individuals who abuse drugs/alcohol have a genetic/biological vulnerability to such behavior.

## Reciprocal Relationship Between Biological and Social Risk Factors

In the model, psychosocial risk factors can give rise to biological risk factors, just as biological risk factors can make individuals vulnerable to social risk factors. In Figure 1, this reciprocal relationship is indicated by the double-headed arrow between biological and social risk factors. For example, teenage pregnancy as one component of social adversity generally is viewed as a psychosocial risk factor, but it could be that genetic/biological traits (e.g., high hormone levels) may predispose some individuals to engage in sexual relationships as teenagers and become pregnant. Nevertheless, the key point of the model is that it suggests that the *interaction* between social and biological risk factors is the critically important process in predisposing to later aggression, hyperactivity, and delinquency.

## Interaction, Mediator, and Moderator Effects

**Interaction effects**—An interaction refers to the effects of two risk factors—they are not merely additive, but are instead multiplicative. The model argues that the likelihood of later externalizing behavior would be strongly increased when biological risk factors combine with social risk factors. More specifically, children of mothers who experience both biological risk factors (e.g., birth complications, nutrition deficits) and psychosocial risk factors (e.g., social adversity) will be more likely to develop externalizing behavior problems (e.g., aggression, hyperactivity) than will children of mothers who have no risk factors or who only experience either biological or social risk factors. This interaction effect would be thought of as predisposing to significantly more externalizing behavioral problems than what would be expected from the simple addition of the separate effects of biological and social risk factors.

**Mediator effects**—A mediator variable is a variable that accounts for a significant portion of the relationship between the predictor and the outcome variable. Mediators can explain the mechanism of action. Whereas moderator variables specify under what circumstances certain effects will hold, mediators speak to how or why such effects occur (Baron & Kenny, 1986). For example, a mediator is IQ, because it could be that lowered intelligence is the mechanism underlying the relationship between early biosocial risk factors and childhood externalizing behavior.

**Moderator effects**—A moderator variable is a variable that moderates, or changes, the relationship between risk factors and the outcome. For example, the interaction between biological and social risk factors may predispose to externalizing behavior in boys, but not girls.

## Clinical Implications

Childhood externalizing behavior problems are important predispositions to later violent offenders (Betz, 1995; Farrington & Hawkins, 1991). Violence prevention and protection from victimization have become two of the most pressing issues facing society today (Ahmad, 2004; Calabro, Mackey, & Williams, 2002; Comerci, 1996; Morrison et al., 2002; Stoff et al., 1997). Identification of early risk factors for childhood and adolescent externalizing behavior is a critically important step for developing successful prevention programs for adult violence. As one of many examples, Webster-Stratton & Hammond (1997) have demonstrated that parent training that results in more competent and positive parenting by the mother is associated with reduced conduct problems in the child. Consequently, studies on risk factors may help to further inform which early intervention and prevention programs may help prevent the development of externalizing behavior in children.

However, to date there has been little recognition of the ways in which the nursing profession can affect the prevention of externalizing behavior. A study by Olds et al. (1998), which demonstrated the effectiveness of pre- and postnatal home visitations by nurses in significantly reducing juvenile delinquency 15 years later, provides a new vista for nursing. From the health prevention and promotion perspective, using a biosocial approach to understanding childhood externalizing behavior, juvenile delinquency, and violence has turned into a new and perhaps inevitable endeavor for the nursing scientist, educator, and practitioner. Because externalizing behavior is a major predisposition to violence, tackling the causes of this behavior problem can help tackle violence.

For example, birth complications combined with poor parenting (Gardner, 2000; Hodgins, Kratzer, & McNeil, 2001), maternal rejection (Raine, Brennan, & Mednick, 1994), or social adversity (Arsenault, Tremblay, Boulerice, & Saucier, 2002) were found to directly predispose to externalizing and antisocial behavior problems. Therefore, intervention involving better prenatal care, or effective parenting or better social service, can help reduce the risk factors. Furthermore, birth complications also were found to be linked to poor cognitive ability (Fattal-Valevski et al., 1999; Taylor, Klein, Schatschneider, & Hack, 1998), and poor cognitive ability was found to predispose to externalizing behavior problems (Deitz, Lavigne, Atrend, & Rosenbaum, 1997; Huesmann, Eron, & Yarmel, 1987).

In addition, early poor cognitive ability was found to be linked to later externalizing behavior in children in other studies. Liu et al. (in press) have shown that, compared to controls, children with malnutrition at age 3 years have higher externalizing behavior problems (antisocial, aggressive, and hyperactive behavior) at ages 8, 11, and 17. Results were independent of psychosocial adversity, and low IQ mediated the link between malnutrition and externalizing behavior at ages 8 and 11 years.

If the mediation model illustrated in Figure 1 is correct, it would be expected that factors that improve intelligence would reduce antisocial behavior. Early enrichment programs such as Head Start, which improve cognitive ability (Barnett, 1998), may be effective in preventing antisocial behavior (Raine, Mellinger, Liu, Venables, & Mednick, 2003). Because malnutrition and birth complications were found to contribute to low intelligence (Liu, 2004; Liu, Raine, Venables, Dalais, & Mednick, 2003), it could be expected that interventions to reduce malnutrition and birth complications would be helpful in reducing outcome for poor cognitive ability, and hence outcome for externalizing behavior.

## Conclusion

Childhood externalizing behavior is an important construct in the field of child and adolescent psychiatric and mental health nursing. A better understanding of this behavior problem and the



risk factors underlying it is essential for learning how to prevent these behavior problems in the future. By developing a strong knowledge base on externalizing behavior, it will be possible to develop interventions that reduce externalizing behavior.

### Acknowledgements

This paper is supported by NINR predoctoral fellowship 1 F31 NR07518-02. The author is grateful for Dr. Ann Wuerker and Dr. Adrian Raine for their valuable comments and critical suggestions.

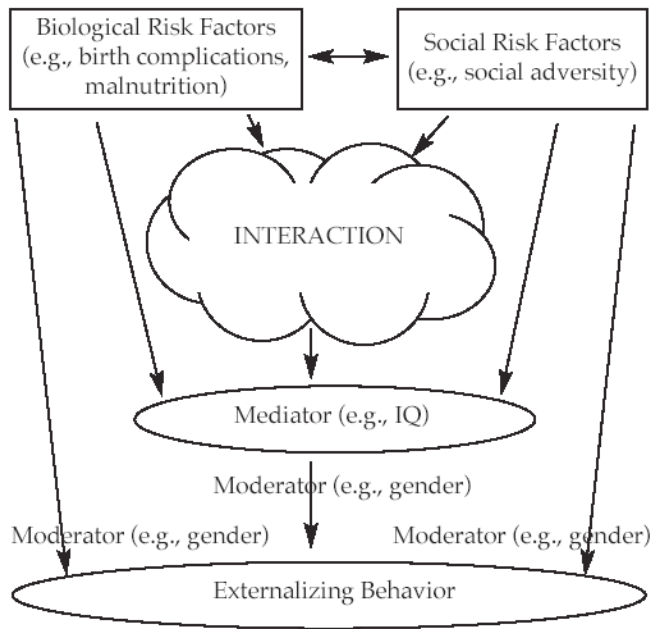
### References

- Achenbach TM. The child behavior profile: I. Boys aged 6–11. *Journal of Consulting and Clinical Psychology* 1978;46:478–488. [PubMed: 670491]
- Achenbach, TM. Burlington, VT: University of Vermont Department of Psychiatry; 1991. Manual for the Child Behavior Checklist/4–18 and 1991 Profile.
- Achenbach, TM.; Edelbrock, CS. Burlington: University of Vermont Department of Psychiatry; 1983. Manual for the Child Behavior Checklist and revised Child Behavior Profile.
- Ahmad K. Violence prevention receives international attention. *Lancet* 2004;363:220. [PubMed: 14746321]
- American Psychiatric Association. 4th ed. Washington, DC: Author; 1994. Diagnostic and statistical manual of mental disorders.
- Arsenault L, Tremblay RE, Boulerice B, Saucier JF. Obstetrical complications and violent delinquency: Testing two developmental pathways. *Child Development* 2002;73:496–508. [PubMed: 11949905]
- Atkins MS, Stoff DM. Instrumental and hostile aggression in childhood disruptive behavior disorders. *Journal of Abnormal Child Psychology* 1993;21:165–178. [PubMed: 8491930]
- Barkley RA, Fischer M, Edelbrock CS, Smallish L. The adolescent outcome of hyperactive children diagnosed by research criteria: I. An 8-year prospective follow-up study. *Journal of the American Academy of Child and Adolescent Psychiatry* 1990;29:546–557. [PubMed: 2387789]
- Barnett WS. Long-term cognitive and academic effects of early childhood education on children in poverty. *Preventive Medicine* 1998;27:204–207. [PubMed: 9578996]
- Baron RM, Kenny DA. The moderator-mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology* 1986;51:1173–1182. [PubMed: 3806354]
- Betz CL. Childhood violence: A nursing concern. *Issues in Comprehensive Pediatric Nursing* 1995;18:149–161. [PubMed: 8707649]
- Brennan PA, Grekin ER, Mednick SA. Maternal smoking during pregnancy and adult male criminal outcomes. *Archives of General Psychiatry* 1999;56:215–219. [PubMed: 10078497]
- Calabro K, Mackey TA, Williams S. Evaluation of training designed to prevent and manage patient violence. *Issues in Mental Health Nursing* 2002;23:3–15. [PubMed: 11887608]
- Campbell JC, Harris MJ, Lee RK. Violence research: An overview. *Scholarly Inquiry for Nursing Practice* 1995;9:105–126. [PubMed: 7667565]
- Campbell SB, Shaw DS, Gilliom M. Early externalizing behavior problems: Toddlers and preschoolers at risk for later maladjustment. *Development and Psychopathology* 2000;12:467–488. [PubMed: 11014748]
- Campbell JC, Woods AB, Chouaf KL, Parker B. Reproductive health consequences of intimate partner violence: A nursing research review. *Clinical Nursing Research* 2000;9:217–237. [PubMed: 11276617]
- Cicchetti D, Lynch M. Toward an ecological/transactional model of community violence and child maltreatment: Consequences for children's development. *Psychiatry: Interpersonal and Biological Processes* 1993;56:96–118.
- Curran GM, White HR, Hansell S. Personality, environment, and problem drug use. *Journal of Drug Issues* 2000;30:375–405.
- Deitz KR, Lavigne JV, Atrend R, Rosenbaum D. Relation between intelligence and psychopathology among preschoolers. *Journal of Clinical Child Psychology* 1997;26:99–107. [PubMed: 9118180]

- Dodge, KA. The structure and function of reactive and proactive aggression. In: Pepler, D.; Rubin, K., editors. *The development and treatment of childhood aggression*. Hillsdale, NJ: Erlbaum; 1991. p. 201-218.
- Dodge KA, Schwartz D. 1997. Social information processing mechanisms in aggressive behavior. In: *Handbook of Antisocial Behavior*. 171-180. New York: Wiley.
- Eisenberg N, Cumberland A, Spinrad TL, Fabes RA, Shepard SA, Reiser M, et al. The relations of regulation and emotionality to children's externalizing and internalizing problem behavior. *Child Development* 2001;72:1112-1134. [PubMed: 11480937]
- Eley TC, Lichtenstein P, Stevenson J. Sex differences in the etiology of aggressive and nonaggressive antisocial behavior: Results from two twin studies. *Child Development* 1999;70:155-168. [PubMed: 10191520]
- Farrington DP. 1987. Implications of biological findings for criminological research. In: *The causes of crime: New biological approaches*. 426-440. New York: Cambridge University Press.
- Farrington DP. Early predictors of adolescent aggression and adult violence. *Violence and Victims* 1989;4:79-100. [PubMed: 2487131]
- Farrington, DP. Childhood aggression and adult violence: Early precursors and later-life outcomes. In: Pepler, DJ.; Rubin, KH., editors. *The development and treatment of childhood aggression*. Hillsdale, NJ: Lawrence Erlbaum; 1991. p. 5-29.
- Farrington, DP. The relationship between low resting heart rate and violence. In: Raine, A.; Brennan, PA.; Farrington, DP.; Mednick, SA., editors. *Biosocial bases of violence*. New York: Plenum; 1997. p. 89-106.
- Farrington, DP. Predicting adult official and self-reported violence. In: Pinard, GF.; Pagani, L., editors. *Clinical assessment of dangerousness: Empirical contributions*. New York: Cambridge University Press; 2001. p. 66-88.
- Farrington DP, Hawkins JD. Predicting participation, early onset and later persistence in officially recorded offending. *Criminal Behaviour and Mental Health* 1991;1:1-33.
- Fattal-Valevski A, Leitner Y, Kutai M, Tal-Posener E, Tomer A, Lieberman D, et al. Neurodevelopmental outcome in children with intrauterine growth retardation: A 3-year follow-up. *Journal of Child Neurology* 1999;14:724-727. [PubMed: 10593549]
- Ferris, CFE.; Grisso, T. New York: New York Academy of Sciences; 1996. *Understanding aggressive behavior in children*.
- Feshbach, S. Aggression. In: Mussen, P., editor. *Carmichael's manual of child psychology*. New York: Wiley; 1970. p. 159-259.
- Feshbach S. Dynamics and morality of violence and aggression: Some psychological considerations. *American Psychologist* 1971;26:281-292. [PubMed: 5547169]
- Feshbach ND, Feshbach S. Empathy training and the regulation of aggression: Potentialities and limitations. *Academic Psychology Bulletin* 1982;4:399-413.
- Feshbach, ND.; Feshbach, S. Aggression in the schools: Toward reducing ethnic conflict and enhancing ethnic understanding. In: Trickett, P.; Schellenbach, C., editors. *Violence against children in the family and the community*. Washington, DC: American Psychological Association; 1998. p. 269-286.
- Fishbein, DHE. Belmont, CA: Wadsworth/Thomson Learning; 2001. *Biobehavioral perspectives in criminology*. The Wadsworth series in criminological theory..
- Fogel CI, Belyea M. Psychological risk factors in pregnant inmates: A challenge for nursing. *American Journal of Maternal/Child Nursing* 2001;26:10-16.
- Gardner J. Living with a child with fetal alcohol syndrome. *American Journal of Maternal/Child Nursing* 2000;25:252-257.
- Gournay K. Mental health nursing in 2001: What happens next? *Journal of Psychiatric and Mental Health Nursing* 2001;8:473-476. [PubMed: 11842474]
- Hadley M. Relational, indirect, adaptive, or just mean: Recent work on aggression in adolescent girls—Part I. *Studies in Gender and Sexuality* 2003;4:367-394.
- Hann, DM. Bethesda, MD: National Institute of Mental Health; 2002. *Taking stock of risk factors for child/youth externalizing behavior problems*.

- Hinshaw SP. On the distinction between attentional deficits/hyperactivity and conduct problems/aggression in child psychopathology. *Psychological Bulletin* 1987;101:443–463. [PubMed: 3602250]
- Hodgins S, Kratzer L, McNeil TF. Obstetric complications, parenting, and risk of criminal behavior. *Archives of General Psychiatry* 2001;58:746–752. [PubMed: 11483140]
- Huesmann, LR. Observational learning of violent behavior: Social and biosocial processes. In: Raine, A.; Brennan, PA.; Farrington, DP.; Mednick, SA., editors. *Biosocial Bases of violence*. New York: Plenum; 1997. p. 69-88.
- Huesmann LR, Eron LD, Yarmel PW. Intellectual functioning and aggression. *Journal of Personality and Social Psychology* 1987;52:232–240. [PubMed: 3820075]
- Hutchings, B.; Mednick, SA. Registered criminality in the adoptive and biological parents of registered male criminal adoptees. In: Mednick, SA.; Schulsinger, F.; Higgins, J.; Bell, B., editors. *Genetics, environment, and psychopathology*. Amsterdam: New Holland; 1975. p. 215-227.
- Lilienfeld SO, Waldman ID. The relation between childhood attention-deficit hyperactivity disorder and adult antisocial behavior reexamined: The problem of heterogeneity. *Clinical Psychology Review* 1990;10:699–725.
- Little L, Kantor GK. Using ecological theory to understand intimate partner violence and child maltreatment. *Journal of Community Health Nursing* 2002;19:133–145. [PubMed: 12378891]
- Liu J. Prenatal and perinatal complications as predispositions to externalizing behavior. *Journal of Prenatal and Perinatal Psychology and Health* 2004;18:301–311.
- Liu J, Raine A, Venables PH, Dalais C, Mednick SA. Malnutrition at age 3 years and lower cognitive ability at age 11 years: Independence from psychosocial adversity. *Archives of Pediatric and Adolescent Medicine* 2003;157:593–600.
- Liu J, Raine A, Venables P, Mednick SA. Malnutrition at age 3 years predisposes to externalizing behavior problems at ages 8, 11 and 17 years. *American Journal of Psychiatry*. In press
- Lutenbacher M. Perceptions of health status and the relationship with abuse history and mental health in low-income single mothers. *Journal of Family Nursing* 2000;6:320–340.
- Lynam DR. Early identification of the fledgling psychopath: Locating the psychopathic child in the current nomenclature. *Journal of Abnormal Psychology* 1998;107:566–575. [PubMed: 9830244]
- Mannuzza S, Klein RG, Addalli KA. Young adult mental status of hyperactive boys and their brothers: A prospective follow-up study. *Journal of the American Academy of Child & Adolescent Psychiatry* 1991;30:743–751. [PubMed: 1938789]
- Mannuzza S, Klein RG, Konig PH, Giampino TL. Hyperactive boys almost grown up: IV. Criminality and its relationship to psychiatric status. *Archives of General Psychiatry* 1989;46:1073–1079. [PubMed: 2589922]
- Mednick SA, Gabrielli WF, Hutchings B. Genetic influences in criminal convictions: Evidence from an adoption cohort. *Science* 1984;224:891–894. [PubMed: 6719119]
- Meloy, JR. Northvale, NJ: Jason Aronson; 1988. *The psychopathic mind: Origins, dynamics, and treatment*.
- Moffitt TE. Adolescence-limited and life-course-persistent antisocial behavior—A developmental taxonomy. *Psychological Review* 1993;100:674–701. [PubMed: 8255953]
- Moise JF, Huesmann LR. Television violence viewing and aggression in females. *Annals of the New York Academy of Sciences* 1996;794:380–383. [PubMed: 8853622]
- Morrison E, Morman G, Bonner G, Taylor C, Abraham I, Lathan L. Reducing staff injuries and violence in a forensic psychiatric setting. *Archives of Psychiatric Nursing* 2002;16:108–117. [PubMed: 12037796]
- National Center for Injury Prevention and Control. Atlanta, GA: Centers for Disease Control and Prevention; 1996. 1992—10 leading cases of death.
- Olds D, Henderson CJ, Cole R, Eckenrode J, Kitzman H, Luckey D, et al. Long-term effects of nurse home visitation on children's criminal and antisocial behavior: 15-year follow-up of a randomized controlled trial. *JAMA* 1998;280:1238–1244. [PubMed: 9786373]
- Orlebeke JF, Knol DL, Verhulst FC. Increase in child behavior problems resulting from maternal smoking during pregnancy. *Archives of Environmental Health* 1997;52:317–321. [PubMed: 9210734]

- Parker B, McFarlane J, Soeken K, Silva C, Reel S. Testing an intervention to prevent further abuse to pregnant women. *Research in Nursing and Health* 1999;22:59–66. [PubMed: 9928964]
- Preski S, Shelton D. The role of contextual, child and parent factors in predicting criminal outcomes in adolescence. *Issues in Mental Health Nursing* 2001;22:197–205. [PubMed: 11885223]
- Quay HC. A dimensional approach to behavior disorder: The Revised Behavior Problem Checklist. *School Psychology Review* 1983;12:244–249.
- Quay HC. The psychobiology of undersocialized aggressive conduct disorder: A theoretical perspective. *Development and Psychopathology* 1993;5:165–180.
- Raine A. The role of prefrontal deficits, low autonomic arousal, and early health factors in the development of antisocial and aggressive behavior. *Journal of Child Psychology and Psychiatry* 2002;43:311–326.
- Raine, A.; Brennan, P.; Farrington, D.; Mednick, SA. New York: Plenum Press; 1997. Biosocial basis of violence.
- Raine A, Brennan P, Mednick SA. Birth complications combined with early maternal rejection at age 1 year predispose to violent crime at age 18 years. *Archives of General Psychiatry* 1994;51:983–988.
- Raine A, Mellingen K, Liu J, Venables P, Mednick SA. Effects of environmental enrichment at ages 3–5 years on schizotypal personality and antisocial behavior at ages 17 and 23 years. *American Journal of Psychiatry* 2003;160:1627–1635. [PubMed: 12944338]
- Rowe DC. Biometrical genetic models of self-reported delinquent behavior: A twin study. *Behavior Genetics* 1983;13:473–489. [PubMed: 6686763]
- Satterfield JH, Hoppe CM, Schell AM. A prescriptive study of delinquency in 110 adolescent boys with attention deficit disorder and 88 normal adolescent boys. *American Journal of Psychiatry* 1982;139:795–799. [PubMed: 7081495]
- Shahinfar A, Kupersmidt JB, Matza LS. The relation between exposure to violence and social information processing among incarcerated adolescents. *Journal of Abnormal Psychology* 2001;110:136–141. [PubMed: 11261387]
- Shaw, DS.; Winslow, EB. Precursors and correlates of antisocial behavior from infancy to preschool. In: Stoff, DM.; Breiling, J.; Maser, J., editors. *Handbook of antisocial behavior*. New York: Wiley; 1997. p. 148-158.
- Stoff, D.; Breiling, J.; Maser, J. New York: Wiley; 1997. *Handbook of antisocial behavior*.
- Susman EJ. Psychological, contextual, and psychobiological interactions: A developmental perspective on conduct disorder. *Development and Psychopathology* 1993;5:181–189.
- Taylor HG, Klein N, Schatschneider CM, Hack M. Predictors of early school-age outcomes in very low birthweight children. *Journal of Developmental and Behavioral Pediatrics* 1998;19:235–243. [PubMed: 9717132]
- Webster-Stratton C, Hammond M. Treating children with early-onset conduct problems: A comparison of child and parent training interventions. *Journal of Consulting and Clinical Psychology* 1997;65:93–109. [PubMed: 9103739]
- Widom, CS. Child abuse, neglect, and witnessing violence. In: Stoff, DM.; Breiling, J.; Maser, J., editors. *Handbook of antisocial behavior*. New York: Wiley; 1997. p. 159-170.



**Figure 1.**  
Biosocial Interaction Model of Childhood Externalizing Behavior