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Developmental Pathways
in Boys' Disruptive and Delinquent Behavior

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This Bulletin is part of the Office of Juvenile Justice and Delinquency Prevention (OJJDP) Youth Development Series, which presents findings from the Program of Research on the Causes and Correlates of Delinquency. Teams at the University at Albany, State University of New York; the University of Colorado; and the University of Pittsburgh collaborated extensively in designing the studies. At study sites in Rochester, New York; Denver, Colorado; and Pittsburgh, Pennsylvania, the three research teams have interviewed 4,000 participants at regular intervals for nearly a decade, recording their lives in detail. Findings to date indicate that preventing delinquency requires accurate identification of the risk factors that increase the likelihood of delinquent behavior and the protective factors that enhance positive adolescent development.

Boys may follow various developmental pathways that lead to increasingly disruptive and delinquent behavior. To most parents, teachers, youth workers, mental health professionals, and juvenile justice practitioners, the development of disruptive and delinquent behavior in boys may appear erratic and unpredictable. These adults may be confronted by boys at various ages who display disruptive behavior at home, at school, and/or in the community and commit delinquent acts, such as minor theft, vandalism, robbery, and rape.

It is difficult for these adults to see a pattern in such behaviors or to accurately predict what disruptive or delinquent youth will do next. Parents, who are most intimately familiar with their sons' lives, may have limited knowledge of so-called "normal" child and adolescent behavior, much less an awareness of how best to handle their own troublesome boys. Teachers and youth workers encounter a fairly wide spectrum of child and adolescent behavior on a daily basis, but often are not fully aware of an individual boy's long-term progression into disruptive and delinquent behavior. Troubled boys frequently are not referred to mental health professionals or brought to the attention of juvenile justice practitioners until they have established a serious pattern of disruptive and/or delinquent behavior. Once such patterns are well entrenched, intervention efforts are more difficult.

This Bulletin summarizes longitudinal research from the Pittsburgh Youth Study, which examined an all-male sample. The study shows that the development of disruptive and delinquent behavior by boys generally takes place in an orderly, progressive fashion, with less serious

From the Administrator

Two roads diverged in a wood, and I—
I took the one less traveled by,
And that has made all the difference.
(Robert Frost, "The Road Not Taken")

The paths we take early in life often do make a considerable difference in the destinations that await us down the road. Pathways of particular concern are those that route some young boys to disruptive behavior and delinquency.

Researchers with the Pittsburgh Youth Study, a principal component of the Office of Juvenile Justice and Delinquency Prevention's Program of Research on the Causes and Correlates of Delinquency, have documented three developmental pathways that boys follow as they progress to more serious problem behaviors. Each pathway represents conceptually similar behaviors that unfold over time. They include conflict with authority (defiance and running away), covert actions (lying and stealing), and overt actions (aggression and violent behavior).

The longitudinal research summarized in *Developmental Pathways in Boys' Disruptive and Delinquent Behavior* helps us to better understand past, present, and future antisocial behaviors. This knowledge, in turn, will better equip us to identify problem behaviors early enough to intervene effectively before they lead to serious delinquency.

Shay Bilchik
Administrator

problem behaviors preceding more serious problem behaviors. The researchers documented three developmental pathways that display progressively more serious problem behaviors among boys in three conceptually similar domains: authority conflict (defiance and running away), covert actions (lying and stealing), and overt actions (aggression and violent behavior).

The researchers believe that conceptualization of past, current, and future disruptive behavior can best be captured by means of developmental pathways. A pathway is identified when a group of individuals experience a behavioral development that is distinct from the behavioral development of other groups of individuals.

In a developmental pathway, stages of behavior unfold over time in an orderly fashion. Individuals may proceed along single or multiple developmental pathways toward serious antisocial behavior, with each pathway representing major dimensions of disruptive and delinquent behavior. Understanding these progressions will help us to identify problem behavior and intervene earlier and more effectively in the lives of troubled boys before they advance to the more serious stages of delinquent and disruptive behaviors.

Key Questions in the Construction of a Developmental Pathways Model

Investigating developmental pathways in disruptive and delinquent behavior requires considerable detective work. The first step is identifying and assessing a broad spectrum of problem behaviors exhibited by individual children and youth. Key questions to address in the identification of developmental pathways in disruptive and delinquent behavior include:

- Which specific disruptive and delinquent problem behaviors merit attention?
- Is there an age or age range during which each behavior is most likely to emerge?
- At what ages or for how long does each behavior remain a part of the individual's repertoire?
- Does one problem behavior cluster with other problem behaviors?
- Are there several clusters of such behavior, and are the behaviors in each cluster conceptually similar, such as aggressiveness, covertness, and defiance?
- Within each cluster of behavior, can behavioral problems be ranked in a continuum from less to more serious?
- Does this ranking correspond with the chronological ordering of age of onset of specific behaviors?
- Can developmental pathways for individuals be documented in such a way that the less serious conceptually similar behaviors emerge prior to more serious behaviors?

Construction of developmental pathways for boys' disruptive and delinquent behaviors did not begin with the Pittsburgh Youth Study, but rather benefited from years of research by the principal investigator, Rolf Loeber, his colleagues, and other researchers specializing in a developmental approach to child psychopathology and criminology. This Bulletin highlights Loeber's key steps in building a developmental pathways model, in which advances were incremental. By documenting the emerging behaviors of male participants in the longitudinal Pittsburgh Youth Study, Loeber has developed an extensive data base for formulating, testing, and refining his conceptual framework for male progressions into disruptive and delinquent behaviors.

Assessment of Inappropriate Behavioral Development

It is far easier to measure a child's physical growth and maturation than to assess the complexities of individual differences in children's disruptive and antisocial development. Pediatricians can clearly record increases in a child's weight and height on growth charts and even provide percentile estimates indicating how a child compares to others at the same age. Measuring and interpreting acceptable versus unacceptable and normal versus abnormal behaviors among children and adolescents are far more complex.

Children and adolescents often test the limits of appropriate conduct by crossing the boundaries set by caretakers. When a youth exhibits a particular problem behavior, it is important to consider not only if the behavior has previously occurred, but also if it is exhibited in multiple settings and with what frequency, duration, intensity, and provocation. For example, a 2-year-old who playfully nips a playmate is less off the mark of developmentally appropriate behavior than a 4-year-old who aggressively and frequently bites playmates to forcefully gain possession of desired toys.

Among adolescents, a certain degree of misbehavior, experimentation, or independence seeking is common. In fact, the American Psychiatric Association (1994) indicates that "New onset of oppositional behaviors in adolescence may be due to the process of normal individuation." On the other hand, youth who persistently and progressively engage in problem behaviors with significant impairment in personal development, social functioning, academic achievement, and vocational preparation are of great concern to caretakers. Also of concern is the broad category of "antisocial behaviors" that have an appreciable harmful effect on others, in terms of inflicting physical or mental harm on others or causing property loss or damage.

The Semantics of Disruptive and Delinquent Behavior

A mother finds parenting exhausting and describes her 7-year-old son as extremely energetic, frequently switching from one play activity to another, often losing his things, and forgetting to do his chores. A second grade teacher notes that her student has a learning disability, as he is unruly, requires constant disciplinary attention, fidgets or squirms in his seat, fails to follow directions or complete assignments, refuses to wait his turn, and often disturbs his classmates. A child psychologist indicates a young boy lacks the ability for sustained mental effort, is easily distracted by extraneous stimuli, displays poor impulse control, and meets the criteria for Attention-Deficit/Hyperactivity Disorder (ADHD), as defined in *Diagnostic and Statistical Manual of Mental Disorders: Fourth Edition* (American Psychiatric Association, 1994). The mother, teacher, and psychologist could all be speaking about the same 7-year-old boy, each from his/her own perspective. Research indicates that young boys with ADHD are at increased risk for subsequent involvement in other disruptive and delinquent behaviors (Hinshaw, 1987).

What is meant by disruptive behavior and delinquent behavior? According to

parents, this may include disobedience, fighting with siblings, destroying or damaging property, stealing money from family members, demanding attention, threatening parents with violence, and keeping the household in an uproar.

Teachers and school principals find students' behavior unacceptable when it interrupts or disturbs classroom learning, violates the code of conduct in school, threatens the safety of faculty and students, and involves vandalism or theft. Students displaying such behaviors may be expelled, suspended, or placed in special, remedial, or alternative education programs. Many of these boys have been labeled emotionally disturbed, behaviorally disordered, learning disabled, handicapped, exceptional, or truant. The criteria for such labels vary across States and localities. Research has shown that students with learning disabilities and behavioral disorders are more likely to come into contact with the juvenile justice system and are more likely to be incarcerated (Leone, Rutherford, and Nelson, 1991).

Mental health practitioners consider a range of diagnostic labels as disruptive child behaviors, including hyperactivity/inattention; negativistic, oppositional, and defiant behavior; and conduct disorder that may involve aggression to people and animals, destruction of property, deceitfulness or theft, and serious violation of rules, such as those regarding curfews and school attendance (American Psychiatric Association, 1994).

Among juvenile justice practitioners, the disruptive and delinquent behaviors of concern are legally defined as:

- Delinquent acts involving the destruction or stealing of property, commission of violent crimes against persons, possession or sale of alcohol or drugs, and illegal possession of weapons.
- Status offenses, which would not be considered an offense if committed by an adult, such as truancy, running away, alcohol possession or use, and curfew violations.

Children and youth are considered "beyond control" of the parents or guardians when their behavior is so poorly regulated that it requires the attention of the family court to establish adequate supervision of these dependent youth.

Considerable overlap exists among the more severe types of family disruption, many school disciplinary infractions, the mental health categories of conduct disorder and oppositional defiant disorder, and the justice categories of delinquent and status offenses and being beyond control. It is important to set aside labels based on the perspective of any single discipline and focus instead on the actual behaviors being described. Clearly, the semantics of disruptive behavior cross many disciplines.

Onset of Problem Behavior in Boys

At what age can the emergence of behavioral problems first be detected? In a review of developmental approaches to aggression and conduct problems, Rolf Loeber and Dale F. Hay (1994) described the emergence of both opposition to parents and aggression with siblings and peers as a natural occurrence during the first 2 years of life. As toddlers develop speech capacities, they are more likely to utilize words to resolve conflicts. In general, oppositional behaviors decline between ages 3 and 6, as children acquire more prosocial skills for expressing their needs and dealing with conflict.

Some toddlers and preschoolers distinguish themselves from the norm by committing acts of intense aggression, initiating hostile conflict rather than reacting when provoked, and generally being characterized by parents as having a difficult temperament rather than one of harmony and ease. In a study of 205 boys ages 10 to 16, mothers were asked to rate how easy or difficult it had been to get along with the child when he was 1 to 5 years old. Five years later, when the boys were 15 to 21 years old, those originally characterized by their mothers as "difficult" had an officially reported delinquency rate that was twice as high as that of the children characterized as "easy." The rate of self-reported delinquent acts committed by the "difficult" children was also significantly higher than that of the "easy" children. The researchers (Loeber, Stouthamer-Loeber, and Green, 1991) issued the following challenge to researchers and therapists:

- Develop better criteria for distinguishing between those preschoolers who are more or less likely to outgrow problem behavior.
- Improve intervention technologies that steer children away from a path of serious maladjustment.

Developmental Ordering of Problem Behavior

Manifestations of disruptive behaviors in childhood and adolescence are often age dependent, reflecting a developing capability to display different behaviors with age (Loeber, 1990). Figure 1 shows the approximate ordering of the different manifestations of problem behaviors, including disruptive and delinquent behaviors, from early childhood through adolescence.

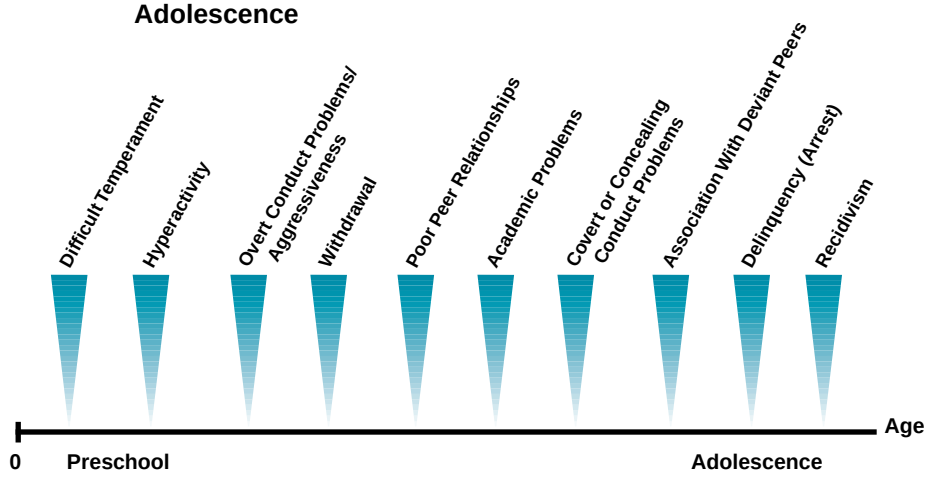
After birth, the earliest problem noted is generally the infant's difficult temperament. Although activity level is one dimension of temperament, hyperactivity becomes more apparent when children are able to walk. Overt conduct problems, such as aggression, are usually not recognized until age 2 or later, when the child's mobility and physical strength have increased. During the preschool years, the quality of the child's social contacts becomes evident, including excessive withdrawal or poor relationships with peers and/or adults. Academic problems rarely emerge clearly before the child attends first or second grade. Beginning at elementary school age and continuing through early adolescence, covert or concealing conduct problems, such as truancy, stealing, and substance use, become more apparent. Because the age of criminal responsibility in most States is 12 years, children are less often arrested prior to that age. For youth age 12 and older, the prevalence of delinquency and associated recidivism increases.

Figure 1 highlights the fact that a child can exhibit considerable continuity in disruptive and antisocial behaviors, even though the behaviors are manifested differently with increasing age. Children's development toward serious deviant behavior can be thought of as leading to diversification of behaviors, rather than replacement of one problem behavior with another. Few children progress to the most serious behaviors or accumulate the largest variety of such problems. It is more common for children to penetrate the deviancy continuum to a lesser degree, reach a plateau, or reverse to a less serious level.

Increases in Problem Behaviors as a Function of Failure in Developmental Tasks

Children need to acquire several prosocial developmental tasks to counter

Figure 1: Approximate Ordering of the Different Manifestations of Disruptive and Antisocial Behaviors in Childhood and Adolescence



the development of disruptive and delinquent behavior. These developmental tasks are the counterparts of the manifestations of disruptive and delinquent child behavior (see figure 2): nonaggression versus aggression, honesty versus deception, and respect versus conflict with authority figures.

Probably the first relevant developmental task encountered by children is learning to solve interpersonal problems nonaggressively, that is, without verbal or physical aggression. Parents and teachers are the principal models for this developmental task, but other relatives, neighbors, and peers may also play a role. Although mastering this developmental task often starts during the preschool years, for some children the acquisition of interpersonal problem-solving skills continues in subsequent years.

As children's cognitive and verbal abilities increase during the preschool period, they become ready to master the developmental task of being honest. Honesty, which is the counter to lying and deception, is essential to increasing prosocial behavior in youngsters. Somewhere around this time, children also start to learn to respect other people's property and to distinguish between what is "mine" and "yours."

Alongside these developments, children need to learn to respect authority figures, such as parents and teachers. This process typically starts during the preschool years and continues throughout childhood and adolescence. However, as maturation continues, it is natural for children to become more independent from adult caretakers. There is considerable disagreement about the best timing for such independence, with many children wanting to achieve it earlier than their parents want them to. However, educators tend to agree that precocious independence often puts children at risk for later delinquency.

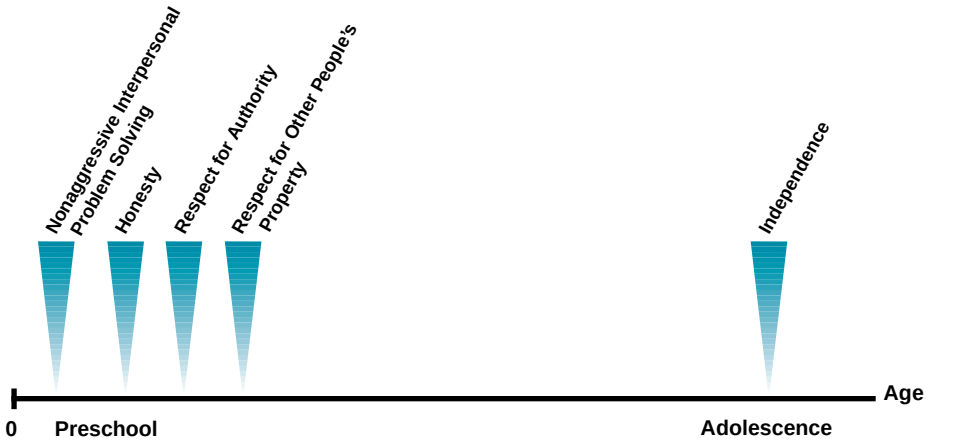
The researchers see children's failures to master these developmental tasks and to acquire other prosocial skills reflected in these tasks as breeding grounds for the development of disruptive and delinquent behavior. Therefore, many youth who eventually become seriously and chronically delinquent somewhere during childhood and adolescence probably missed opportunities to learn one or more key prosocial behaviors.

The acquisition of prosocial developmental tasks is not always smooth. Young children initially respond to developmental tasks utilizing a trial-and-error approach. Older children who have successfully mastered these developmental tasks are also more likely to employ more advanced strategies for problem solving. However, children, like adults, may counter the challenge of new tasks by falling back on former coping strategies, even ones that are disruptive or delinquent. Some youth who have apparently outgrown what would be considered normal problem behavior at a younger age may revert to these behaviors (e.g., oppositional behavior and lying) when faced with new developmental tasks in areas such as schooling and employment.

Basic Dimensions of Disruptive and Delinquent Juvenile Behavior

In order to formulate a model for developmental pathways in disruptive and delinquent behavior, it is first necessary to identify the basic dimension(s) of those behaviors. To minimize the guesswork of this selection process, Loeber and Schmaling (1985) conducted a meta-analysis of the findings from 28 previous studies of parent or teacher ratings of disruptive child behaviors. The researchers produced a multidimensional scale of disruptive behavior, with overt behavior on one pole (e.g., temper tantrums and attacks on people), covert behavior on the other pole (e.g., theft and firesetting), and

Figure 2: Approximate Temporal Sequence of Developmental Tasks Relevant for Prosocial Development During Childhood and Adolescence



disobedience (e.g., authority conflict) situated in the middle of this scale.

More recently, researchers (Frick et al., 1993) repeated the meta-analysis on an expanded number of 44 published studies involving 28,400 children and adolescents of both genders. The researchers incorporated into this meta-analysis the findings for 60 different factor analyses on child and adolescent problem behaviors using ratings by parents or teachers. The results shown in figure 3 basically replicated those reported by Loeber and Schmaling in 1985, with one difference—a destructive-nondestructive dimension of problem behavior was also extracted. In figure 3, the distance between points on the matrix signifies the extent to which different behaviors correlate, or go together. That is, closely positioned behaviors (such as running away and truancy) tend to go together very often, whereas behaviors that are distant (such as running away and assault) tend to go together far less often.

This work was instrumental in advancing an understanding of how certain disruptive behaviors might be clustered in three conceptually similar groupings: overt, covert, and authority conflict. These clusters later served as the theoretical basis for proposing three developmental pathways, which will be discussed later. Property violations, shown in the upper left quadrant, are considered part of the covert pathway. Aggression, shown in the upper right quadrant, is considered part of the overt pathway. These overt and covert behaviors are placed higher on the destructive axis, because they result in personal harm or property loss or damage. The authority conflict pathway encompasses status violations and oppositional behaviors under the horizontal axis, which represents disruptive behaviors that do not inflict the same degree of harm or distress on others as aggression and property violations.

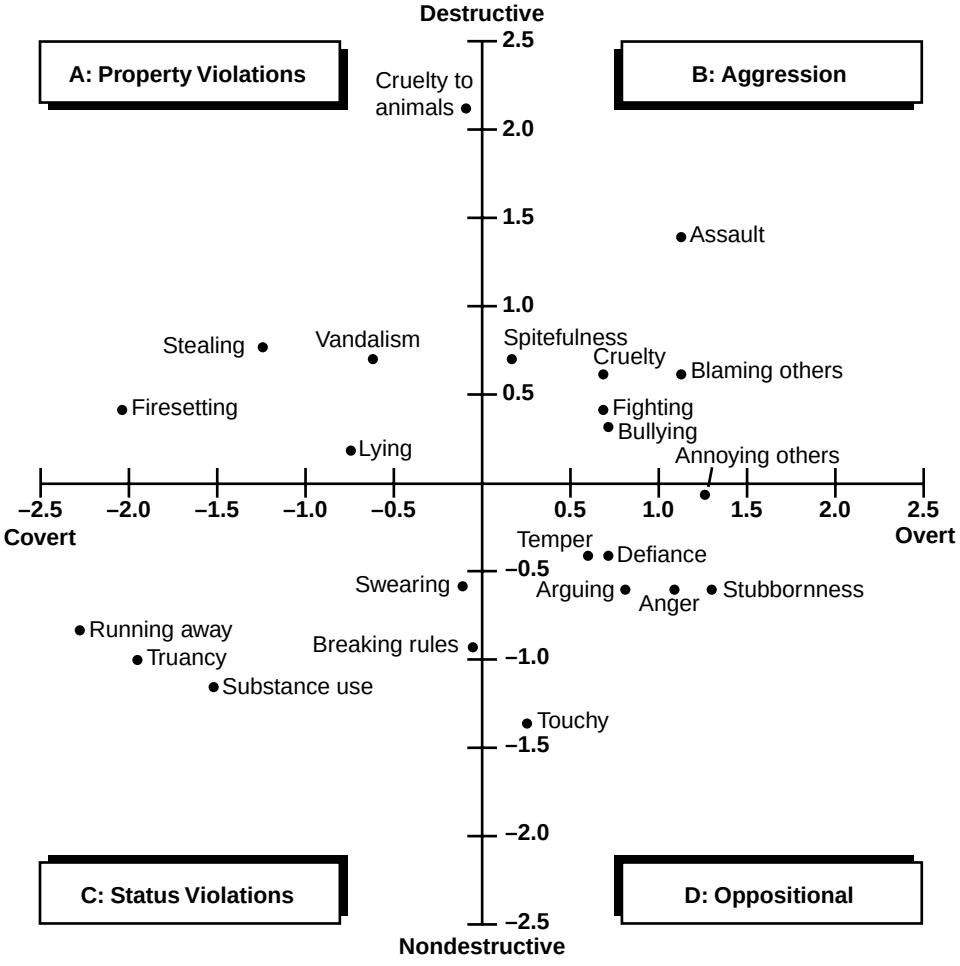
Overview of the Pittsburgh Youth Study

The Pittsburgh Youth Study provides an excellent real-life laboratory for advancing and testing hypothesized developmental pathways. In 1986, OJJDP initiated support for three coordinated projects under the Program of Research on the Causes and Correlates of Delinquency, with study sites in Denver, Pittsburgh, and Rochester. A detailed overview of the three projects is provided in *Urban Delinquency and Substance Abuse: Technical Report* (Huizinga, Loeber, and Thornberry, 1993), which was collaboratively produced by the three research teams under the direction of the principal investigators: David Huizinga at the University of Colorado, Rolf Loeber at the University of Pittsburgh, and Terence P. Thornberry at the University at Albany, State University of New York.

The projects are longitudinal investigations that involve repeated contacts with the same juveniles and their primary caretakers over a substantial portion of their developmental years. This allows the researchers to pinpoint more accurately when a young person initiates certain disruptive behaviors and to examine potential causal factors that influence the onset, frequency, severity, and termination of problem behaviors, such as delinquency.

Initially, researchers at the Pittsburgh Youth Study randomly selected as subjects boys attending the first, fourth, and seventh grades in the Pittsburgh public school system. Of those subjects initially contacted, 84.7% of the boys and their caretakers agreed to participate. An initial screening of each boy, his primary caretaker (usually mother), and a teacher was used to generate retrospective data on the boys' disruptive and delinquent behavior. This information was used to develop a sample with an overrepresentation of boys who had already demonstrated some disruptive behavior. For that purpose, the top 30% of the boys (approximately 250) with the highest rates of disruptive behavior and an equal number of the remaining 70% were selected from each of the three grade cohorts. Boys initially in the first, fourth, and seventh grades are referred to as the

Figure 3: Multidimensional Scale of Disruptive Behavior



Source: Frick et al., 1993.

youngest, middle, and oldest samples, respectively. At the onset of the study in 1987/1988, Pittsburgh's sample of 1,517 boys ranged in age from 7 to 13.

Most of the study findings reported here are weighted to represent the general population of boys attending Pittsburgh's public schools. Across the three cohorts, slightly more than half (53 to 56%) of the boys are African-American; the remainder of the boys are Caucasian. About two-fifths (36 to 47%) of the boys come from families on welfare, and about two-fifths (36 to 44%) live with a single parent. This sample was drawn to capture urban youth considered at high risk for involvement in disruptive, delinquent, and drug-related behaviors. The researchers collected self-report and archival court and school data. (For more details on sample selection and methods, see Loeber et al., 1991.)

Measurement of Disruptive and Delinquent Juvenile Behaviors

The researchers for the Pittsburgh Youth Study questioned boys and their caretakers on a wide spectrum of factors during personal interviews occurring at 6-month intervals. The first interviews were conducted at the time of screening, and subsequent assessments were labeled alphabetically in sequence (A, B, C, etc.). The researchers also gathered archival data from sources such as school and court records.

Table 1 displays the measurement instruments that were used to assess the progressive stages and component behaviors for each of the three developmental pathways in the middle and oldest samples (Loeber et al., 1993). Some of the instruments were administered to mothers, others to their sons. Generally, when both mothers and sons were asked about the same behavior during the same timeframe, the researchers required concurrence between the mothers and sons on behaviors considered commonplace and accepted single-source reports of behaviors considered more difficult to recall or less likely to occur.

The term "retrospective" generally refers to information gathered at either the screening interview or assessment A about life events that preceded the initial data collection. For those behaviors likely to have been initiated at a much younger age, the researchers relied heavily upon the reports of caretakers rather than those of the subjects. For example, caretakers were considered the more reliable source of information regarding the child's history of all authority conflict behaviors, the minor covert behavior of lying, and the less serious forms of aggression, all of which were assessed with the parent version of the Diagnostic Interview Schedule for Children. For those acts that qualified as delinquent, the researchers interviewed the boys directly utilizing the Youth Self-Reported Delinquency Scale.

Prospective data collection involved more overlapping of youth and maternal reports. For these data, recall deterioration was of much less concern since the reporting timeframe was limited to the past 6 months. Again, mothers were considered the more accurate source of information regarding defiant behavior and less serious types of aggression, such as annoying others and bullying. The most prospective data were collected in the youngest sample over nine half-yearly data waves. Boys were in first grade and averaged age 6.9 at screening, and most of them were in the fifth grade and averaged age 10.9 at assessment H. Therefore, when comparing the youngest boys to those 3 (middle sample) and 6 (oldest sample) years older, it is important to note that many of these boys may still be at risk for the onset of specific problem behaviors and may not have reached their peak years for delinquency. Beginning with assessment G, the youngest boys were administered the same instruments as the older boys (the Youth Self-Reported Delinquency Scale and the Youth Self-Report).

Sequences in the Age of Onset of Disruptive and Delinquent Juvenile Behavior

A key issue in developmental pathways is establishing temporal progressions in which less serious behaviors in a given pathway occur before more serious behaviors emerge. A necessary step is sequencing the age of onset of specific behaviors. To do so, the researchers conducted analyses of a wide range of disruptive behaviors initially among the middle and oldest samples, including data collected from the screening and the next five data collection waves (S through E), and later on the youngest sample (waves S through H).

The oldest boys were selected for this presentation of findings because at age 16 (by assessment E) they were more likely than the younger cohorts to have experienced onset of the full range of behaviors. These results from the oldest sample of boys are shown in figure 4 (see page 8), in what are termed "box-and-whisker" plots. Here, the whisker lines extend over the full age range of reported onset, the interior line in the box depicts the median age of onset, and the left and right box sides indicate the ages by which 25% and 75% (respectively) of involved youth experienced onset of a specific behavior. The researchers preferred to focus on the median age, which reflects the point in time by which 50% initiated a specific behavior. The number provided in parentheses indicates how many of the sample of 506 oldest boys reportedly ever engaged in a behavior category (Loeber et al., 1993).

Based on retrospective and prospective data, the median ages of onset for the oldest sample show that stubborn behavior tended to occur earliest at median age 9, with a wide range of onset—the 25th percentile at age 3 and the 75th percentile at age 13. This was followed by minor covert acts, such as lying and shoplifting, at median age 10. Defiance, which involves doing tasks in one's own way, refusing to follow directions, and disobeying, emerged next at median age 11. Aggressive behaviors, such as bullying and annoying others, followed at age 12, along with property damage, such as vandalism and firesetting. More seriously aggressive acts, such as physical fighting and violence, came last at a median age of 13. Also at that age, authority avoidance, such as truancy, running away, and staying out late at night, emerged.

It should be noted that many children in the oldest sample at age 16 had not yet gone through the full-risk period. This implies that the median ages of onset are restricted and are likely to change when the age range is extended to include children who experience a later onset of problem behavior.

It was important to validate whether the developmental sequence applied equally to African-American and Caucasian boys. Substantial agreement was found between the ages of onset of problem behaviors for African-American and Caucasian boys across the samples.

Table 1: Items Used To Generate 10 Sets of Behaviors (Middle and Oldest Samples)

		Instrument Used	
Stages	**Component Behaviors**	**Retrospective**	**Prospective**
Authority conflict			
Stubbornness	Stubbornness	DISC	MCBC, YSR
Defiance	Doing things own way	DISC	MCBC
	Refusing to do things	DISC	MCBC
	Disobedience	DISC	MCBC
Authority avoidance	Staying out late	DISC	MCBC, YSR
	Truancy	DISC	MCBC, YSR, SRD
	Running away	DISC	MCBC, YSR, SRD
Covert behavior			
Minor covert behavior	Lying	DISC	MCBC, YSR
	Shoplifting	SRD	MCBC, SRD
Property damage	Setting fires	SRD	MCBC, SRD
	Damaging property	SRD	SRD
Moderately serious delinquency	Joyriding	SRD	SRD, MCBC
	Pickpocketing	SRD	SRD
	Stealing from car	SRD	SRD
	Fencing stolen goods	SRD	SRD
	Writing illegal checks	SRD	SRD
	Using illegal credit cards	SRD	SRD
Serious delinquency	Stealing a car	SRD	SRD
	Selling drugs	SRD	SRD, MCBC
	Breaking and entering	SRD	SRD
Overt behavior			
Aggression	Annoying others	DISC	MCBC
	Bullying	DISC	MCBC
Fighting	Physical fighting	DISC	MCBC, YSR
	Gang fighting	SRD	SRD, MCBC
Violence	Attacking someone	SRD	SRD
	Strong-arming	SRD	SRD
	Forcing sex	SRD	SRD

Note: DISC = Diagnostic Interview Schedule for Children—Parent Version
MCBC = Maternal Child Behavior Checklist
SRD = Youth Self-Reported Delinquency Scale
YSR = Youth Self-Report
Note: Most of the measures were also used in the youngest sample, but some measures for the boys were adapted because of their young age.

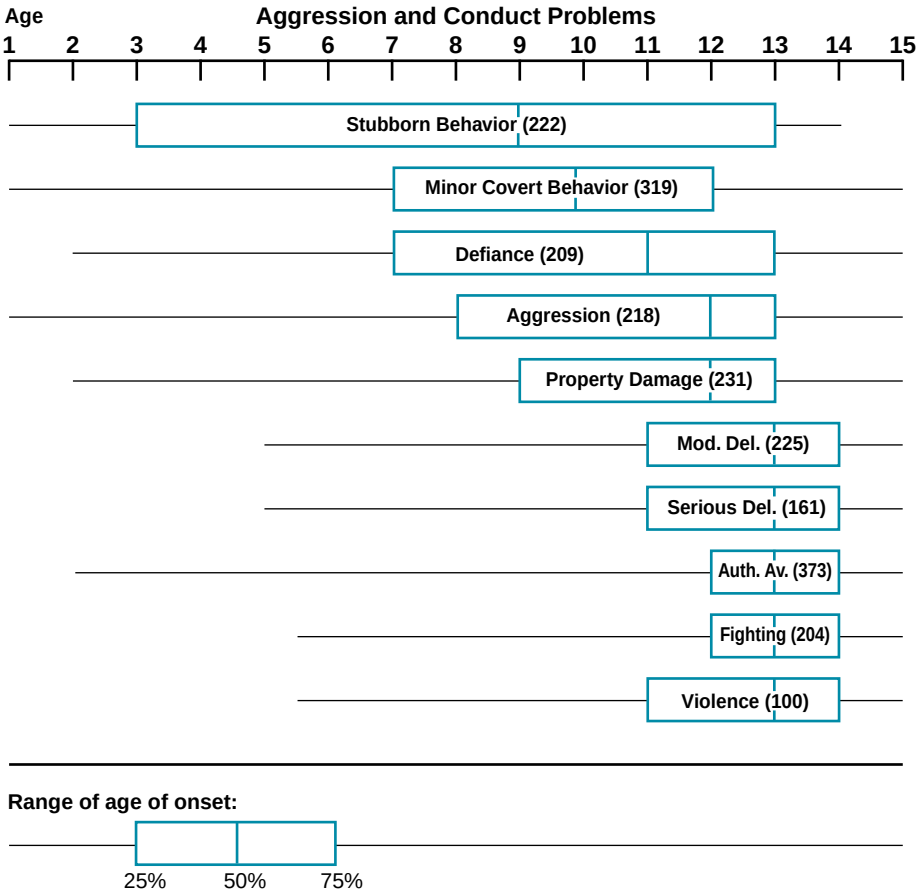
Because of the earlier cited work (Frick et al., 1993; Loeber and Schmaling, 1985) on behavioral dimensions, the researchers next distinguished between the onset of authority conflict behaviors and overt and covert problem behaviors. They found that in each of the three dimensions of problem behavior, the onset of some behaviors occurred before the onset of others (Loeber et al., 1993; Loeber et al., in press). Specifically, the researchers found that for authority conflict behaviors before age 12, the onset of stubborn behaviors tended to occur before the onset of defiance and disobedience, which in turn occurred before the onset of authority avoidance (truancy, running away, and staying out late at night).

Likewise, the researchers found developmental sequences in covert problem behaviors, in that the onset of minor covert acts (lying and shoplifting) tended to occur before the onset of property damage (vandalism and firesetting), which in turn tended to occur before the onset of moderate to serious forms of delinquency (fraud, burglary, and serious theft, such as stealing a car).

In the same manner, the researchers documented developmental sequences in overt problem behavior, in that the onset of minor aggression (bullying and annoying others) tended to precede the onset of physical fighting (including gang fighting), which in turn tended to precede the onset of violence (rape, attacking someone, and strong-arming). These three developmental sequences were replicated across the three grade samples, which strengthened the findings.

Because developmental sequences are based on analyses of variables (i.e.,

Figure 4: Sequence of Age of Onset of Disruptive and Delinquent Child Behavior



Note: This figure reflects oldest sample in Pittsburgh Youth Study. *N* is given in parentheses.
Note: Mod. Del. = Moderate Delinquency
Serious Del. = Serious Delinquency
Auth. Av. = Authority Avoidance
Source: Loeber et al., 1993.

behaviors), they do not reveal to what extent individuals progress over time from one behavior to the other. This aspect can be best captured by developmental pathways.

Developmental Pathways

There is evidence that in juveniles' development less serious forms of delinquency precede the onset of more serious delinquent acts. This reflects the basic hierarchical and developmental feature of psychopathology—less serious manifestations precede the more serious manifestations of deviance (Cicchetti, 1990). This was a common finding in earlier research on sequences in the development of delinquency undertaken by Huizinga (1995) and Elliott (1994) in their analysis of longitudinal data from the National Youth Survey and by Le Blanc, Côté, and Loeber (1991) in their analysis of longitudinal data from Quebec. Unlike the Pittsburgh Youth Study, these studies did not seek to elucidate developmental pathways between nondelinquent disruptive behaviors and various forms of delinquency.

The development of problem behavior is more than just a sequence of behaviors that are independent of each other. Instead, investigators must focus on whether developmental sequences in problem behavior represent systematic changes in behavior of individuals over time. Such a conceptualization of pathways has the following features:

- Most individuals who advance to behaviors down a pathway will have displayed behaviors characteristic of the earlier stages in the temporal sequence.
- Not all individuals progress to the most serious outcome(s); typically, increasingly smaller numbers of individuals reach more serious levels within a pathway.
- Individuals who reach a more serious level in a pathway tend to continue to display behaviors typical of earlier levels, rather than replace them with the more serious acts (Loeber, 1991).

At this point in the Pittsburgh Youth Study analysis, the researchers attempted to combine all of the behaviors sequenced in figure 4 into a single composite pathway for disruptive and delinquent behavior, employing what they termed an "empirical atheoretical approach." The researchers then sought to identify individual subjects whose behavioral sequence matched the composite. The researchers found a group of subjects who fit the main developmental sequence, but also a large remainder group who did not. For that reason, the researchers investigated whether the data could fit multiple pathways.

Pathways in Disruptive and Delinquent Juvenile Behavior

Next, the researchers took a theoretical approach, going back to their earlier work in which authority conflict, covert, and overt problem behaviors were distinguished: Would three pathways prove better than one in accounting for actual behavioral sequences in the lives of individual youth? The following three conceptually distinct pathways are depicted in figure 5.

- **Authority Conflict** is the first and earliest pathway. The pathway begins with stubborn behavior (stage 1) and can be followed by defiance (stage 2), such as refusal and disobedience. This, in turn, can be followed by authority avoidance (stage 3), such as truancy and running away from home. The authority conflict pathway applies to boys prior to age 12, because after that age some youth are likely to enter the pathway at the highest levels with behaviors such as truancy and staying out late at night.
- **Covert** acts and their escalation are addressed in the second pathway. This

pathway tends to start with minor covert behaviors (stage 1), such as lying and shoplifting, and can be followed by property damage (stage 2), including vandalism and firesetting, and later by more serious forms of property crimes (stage 3), such as burglary.

- **Overt** or increasingly aggressive acts make up the third pathway. This sequence starts with minor aggression (stage 1), such as annoying others and bullying. This can be followed by physical fighting (stage 2), including gang fighting, and then by violence (stage 3), such as attacking someone, strong-arming, and rape.

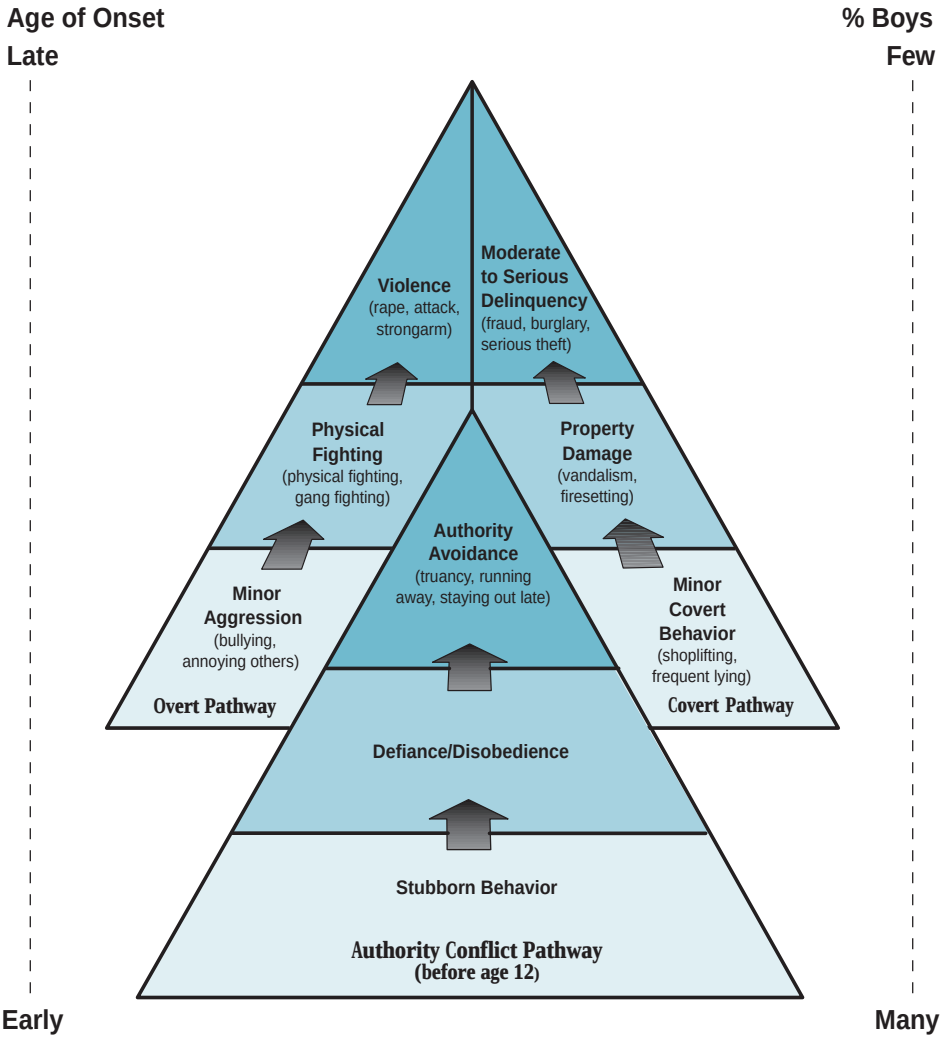
The researchers hypothesized that individuals may proceed along one or more pathways toward serious antisocial behavior. Each of the three proposed pathways represents major dimensions of disruptive behavior. The pathways differentiate between behaviors that result in conflict with or avoidance of authority figures (authority conflict pathway), property loss (covert pathway), and physical harm to others (overt pathway).

Examining How Well Boys Fit Into the Proposed Pathways

The researchers then analyzed how well the youngest, middle, and oldest boys fit into these sequences (Loeber et al., 1993; Loeber et al., in press; Loeber, Keenan, and Zhang, 1997). Did the theoretical pathway models accurately mirror real life for individual boys? The most complete fit would be a temporal progression in the onset of behaviors from stage 1 to stage 2 to stage 3. However, it was recognized that many individuals would not progress the full length of the pathway. Others might skip stage 1, entering the pathway at stage 2 or stage 3. Boys who engaged in specific disruptive behaviors but reversed the temporal order of onset of the prescribed stages were described as not fitting any pathway sequence (e.g., stage 2, property damage, occurring prior to stage 1, minor covert behavior).

For the majority of subjects, the development of disruptive behavior fit the hypothesized pathways of authority conflict (up to age 12), covert behavior, and overt behavior. Those who did not follow the proposed pathway sequences because of reversals (e.g., stage 2 following stage 1 or stage 1 following stage 3) were more common among the oldest boys across the three pathways (8 to 31%) than middle boys (11 to 17%) or the youngest boys (4 to 10%). Therefore, overall, the majority of boys followed all or segments of the developmental sequences postulated in the pathways.

Figure 5: Three Pathways to Boys' Disruptive Behavior and Delinquency



Experimenters Versus Persisters

Up to this point, researchers included all boys engaging in disruptive behavior without taking into account the possible persistence of such problem behavior. The researchers considered that their investigation of developmental pathways was possibly hampered by overinclusion of individuals who experimented with disruptive behavior for only a short time.

Childhood and adolescence are periods during which trying out new things frequently includes behaviors not considered positive or prosocial. Experimentation is considered normal for these age groups, and many youth test the waters of shoplifting, lying, truancy, or annoying their peers. Some youth undertake more serious transgressions. Optimally, experimentation allows youth to discover the negative consequences of their behavior and learn from their mistakes. However, this is not the case for those youth who make the transition from experimenting to persisting in problem behaviors.

In this study, persistence was defined as an endorsement, by either the boy or his primary caretaker, at more than one assessment of problem behavior within a stage of a given pathway. For example, if a mother reported at assessment A that her son often annoyed others and the boy reported at assessment C that he bullied

others (which was also included under the category of minor aggression), the boy was identified as demonstrating persistent aggressive behavior within the overt pathway. The researchers defined experimenters as those boys whose problem behavior within a given stage did not persist or recur at any subsequent assessment phase.

To be categorized as either a persister or an experimenter, the subject had to fit one of the seven temporal sequences of at least one pathway. Nonfitters were not considered, with the exception of the analyses showing how well the pathway model accounts for serious delinquency. Figure 6 displays the decision tree followed to distinguish boys according to fit in a pathway, persistence, and advancement in single or multiple pathways.

The researchers hypothesized (Loeber, Keenan, and Zhang, 1997):

- Persisters will be more likely than experimenters to enter a pathway at its first stage.
- Experimenters will be more likely than persisters to enter a pathway at the second or third stage.
- Persisters will be much more likely than experimenters to follow the sequence of stages in a pathway, thereby developing different manifestations of disruptive behavior more predictably.

Point of Entry and Progressions Into Pathways

Analysis of the point of entry for boys in each of the three samples generally supported the hypothesis that boys entering a given developmental pathway at the first stage were more likely to be persisters, while boys entering at the second or third stage were more likely to be experimenters.

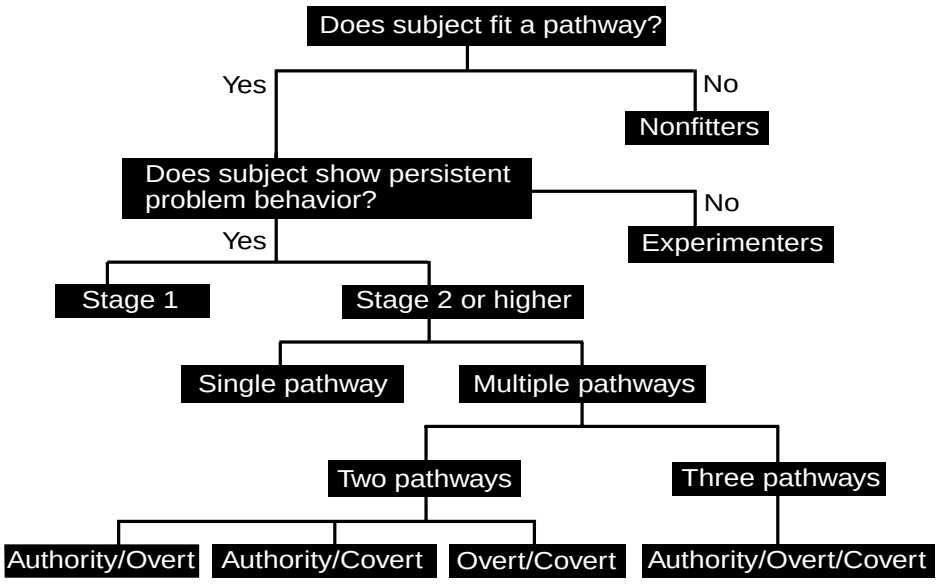
Next, the researchers examined the extent to which persisters who had advanced to the highest stage in each pathway had gone through the preceding stages (Loeber et al., in press; Loeber, Keenan, and Zhang, 1997). These results are summarized in tables 2, 3, and 4 for each respective pathway and exclude experimenters because their behavior is inherently less predictable. Starting with boys who had advanced to authority avoidance (truancy, running away, and staying out late at night) as the last stage of the authority conflict pathway, the researchers questioned how many of these boys also displayed the onset of earlier stages in that pathway previously or concurrently. Table 2 shows that 75.4% and 80.0% of the persisters in the youngest and middle samples, respectively, with authority avoidance (stage 3) had gone through one or more of the preceding stages (e.g., stages 1 and 2, stage 1, or stage 2). The comparable figure for the oldest sample was 57%, indicating that almost half of them had advanced to authority avoidance without going through the intermediate stages. Therefore, the authority conflict pathway held best for the youngest and middle samples.

Turning to the boys who had advanced to the highest stage in the covert pathway (stage 3, moderate to serious delinquency), table 3 shows that almost all of the boys had gone through one or more of the lower stages (95.1 to 97.7%), with no major differences among the samples. Very few boys advanced to stage 3 in that pathway without going through one or more preceding stages.

Finally, table 4 (see page 12) shows similar data for persisters in the overt pathway. Here, the best fit was for boys in the youngest and oldest samples, with 100.0% and 97.6%, respectively, of the boys who displayed violent behavior having gone through one or more of the preceding stages. In comparison, the figure for boys in the middle sample was slightly lower (88.2%). The results show that, among persisters, the majority of violent boys engaged in less serious forms of aggression earlier in life.

These results lend substantial support for the existence of three developmental pathways, with the caveat that the support is stronger for authority conflict pathway in the youngest and middle samples than in the oldest sample.

Figure 6: Decision Tree



Rate of Attention-Deficit/ Hyperactivity Disorder Among Persisters and Experimenters

Boys who persistently engage in disruptive behaviors are likely to come to the attention of a variety of youth service providers. Of particular interest to educators and mental health practitioners are boys who have difficulty at home, in school, and in the community due to attention deficit and hyperactivity problems. The researchers focused on boys who met the criteria established by *Diagnostic and Statistical Manual of Mental Disorders: Third Edition, Revised* (American Psychiatric Association, 1985) for a diagnosis of ADHD based on their mothers' reports at assessment A of current behavior problems.

In addition to the middle and oldest boys, the inclusion of the youngest boys in this analysis was essential. Research indicates that the influence of ADHD on disruptive pathways can be better assessed in a younger sample than an older one

Table 2: Percentage of Males With Authority Avoidance Whose Development Followed the Authority Conflict Pathway Before Age 12*

Authority Conflict Pathway

Stubborn Behavior (1) → Defiance/Disobedience (2) → Authority Avoidance (3)

Sample	Authority-Avoidant Males (N)	Percent Who Followed Full Sequence (1, 2, 3) or Part Sequence (1, 3; 2, 3)	Percent With Authority-Avoidant Behavior Only (3)
Youngest	57	75.4%	24.6%
Middle	70	80.0%	20.0%
Oldest	44	57.0%	43.0%

* Persisters only, leaving out experimenters.
Source: Loeber et al., in press; Loeber, Keenan, and Zhang, 1997.

Table 3: Percentage of Moderate to Serious Delinquent Males Whose Development Followed the Covert Pathway*

Covert Pathway

Minor Covert Behavior (1) → Property Damage (2) → Moderate to Serious Delinquency (3)

Sample	Moderate to Serious Delinquent Males (N)	Percent Who Followed Full Sequence (1, 2, 3) or Part Sequence (1, 3; 2, 3)	Percent With Moderate to Serious Delinquent Behavior Only (3)
Youngest	43	97.7%	2.3%
Middle	56	96.4%	3.6%
Oldest	103	95.1%	4.9%

* Persisters only, leaving out experimenters.
Source: Loeber et al., in press; Loeber, Keenan, and Zhang, 1997.

because symptom scores for ADHD tend to decrease as children age (Hart et al., 1995). Furthermore, boys with ADHD are considered to be at increased risk for involvement in delinquency.

A total of 86 (17%) of the youngest sample, 63 (12%) of the middle sample, and 47 (9%) of the oldest sample met the criteria for ADHD, indicating that prevalence of this diagnosis appeared to decline with increasing age. The percentage of boys with a diagnosis of ADHD is presented for each of the three pathways in figures 7–9 (authority conflict pathway, covert pathway, and overt pathway, respectively; see pages 12 and 13). In the figures, the boys are broken out by age group and three other factors: no display of behavior characteristic of a given pathway, experimentation in a pathway behavior, or persistence at stage 1 or the combined stages 2 and 3.

There is considerable similarity across these figures. First, the youngest boys displayed the highest percentages of ADHD in virtually every category, with the middle boys typically coming in second. Boys of the same age with no pathway behaviors generally had lower prevalence rates of ADHD than boys who experimented with various disruptive behaviors. Significant increases existed between experimenters and persisters of the same age and pathway. Distinctions between stage 1 and stage 2 or 3 persisters were generally not significant in terms of ADHD

Table 4: Percentage of Violent Males Whose Development Followed the Overt Pathway*

Overt Pathway

Minor Aggression → Physical Fighting → Violence

(1) (2) (3)

Sample	Violent Males (N)	Percent Who Followed Full Sequence (1, 2, 3) or Part Sequence (1, 3; 2, 3)	Percent With Violent Behavior Only (3)
Youngest	19	100.0%	0%
Middle	34	88.2%	11.8%
Oldest	41	97.6%	2.4%

* Persisters only, leaving out experimenters.
Source: Loeber et al., in press; Loeber, Keenan, and Zhang, 1997.

rates. The highest rates of ADHD were found among the youngest boys persisting in either the covert pathway or the overt pathway; approximately one-third met the criteria for a diagnosis of ADHD. A lower rate of ADHD was observed for the youngest boys persisting in the authority conflict pathway.

The results clearly demonstrated that ADHD boys were at risk to become experimenters, and even more so to become persisters, in one or more of the developmental pathways. This relationship was strongest among the youngest boys.

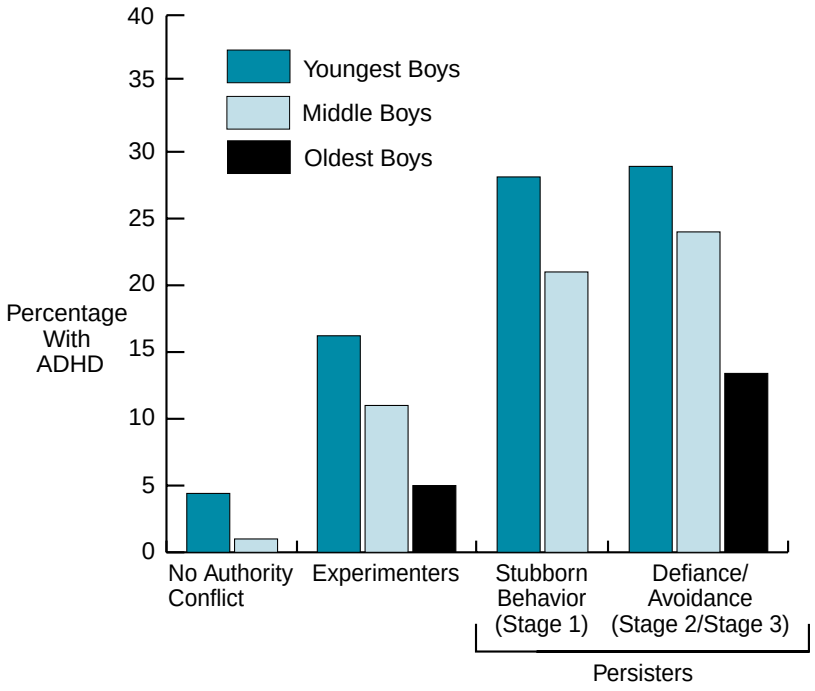
Distribution of Experimenters and Persisters in Single and Multiple Pathways

So far, the analysis has focused on a boy's fitting temporal sequences in a particular single pathway. However, as displayed in figure 10 (see page 14), a boy might also become involved in multiple pathways, including dual pathways (overt/covert, overt/authority conflict, and covert/authority conflict) and triple pathways incorporating overt, covert, and authority conflict behaviors. From a developmental standpoint, it is important to know if a boy's onset and progression in a single pathway increases the likelihood of his entering a second or third pathway.

It is interesting to consider how age influences the distribution of experimenters and persisters in the developmental pathways for disruptive and delinquent behavior. The decision tree presented in figure 6 was developed for categorizing youth who fit a pathway sequence as experimenters versus persisters at stage 1 only or at stage 2 or 3 in single, dual, or triple pathways; the researchers employed this decision tree to assign youth to these seven categories.

Figure 11 (see page 15) displays the seven categories for each of the three age groups. The youngest boys were

Figure 7: Attention-Deficit/Hyperactivity Disorder in Authority Conflict Pathway



Note: The percentage of oldest boys in the "no authority conflict" and "persister (stage 1)" categories was zero.

Figure 8: Attention-Deficit/Hyperactivity Disorder in Covert Pathway

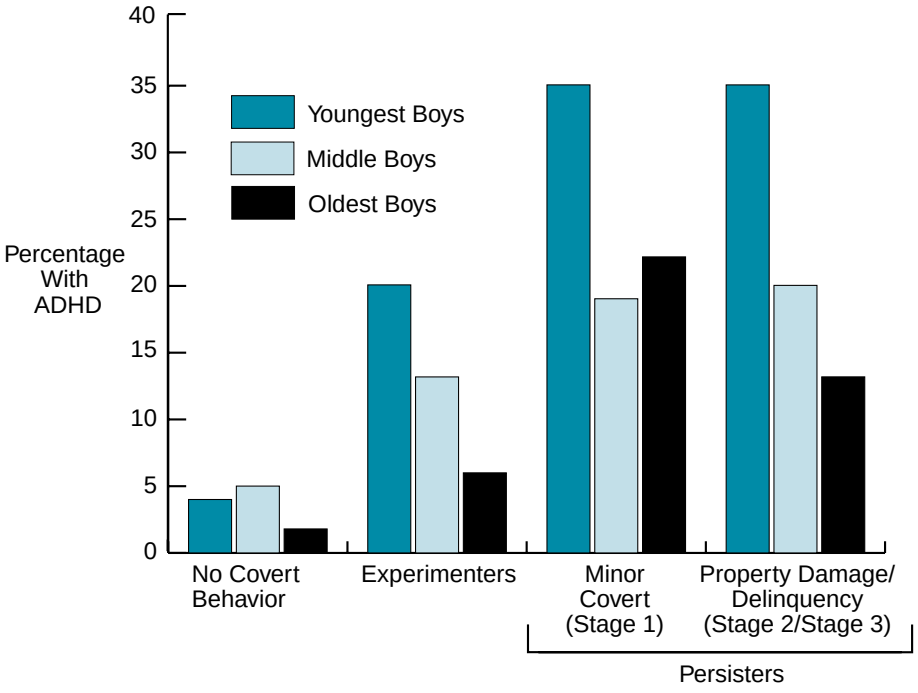
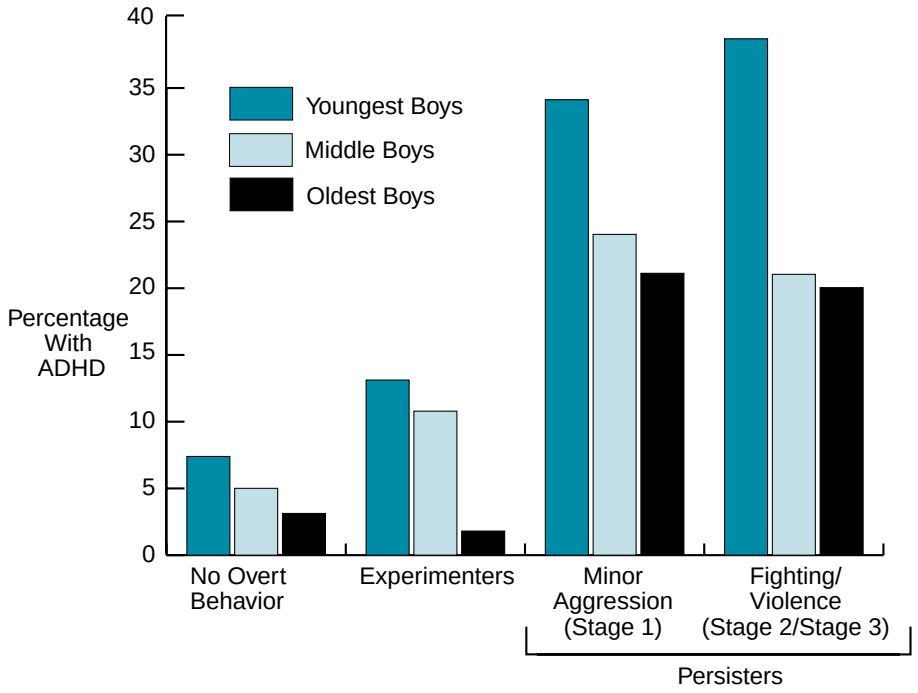


Figure 9: Attention-Deficit/Hyperactivity Disorder in Overt Pathway



most likely to be experimenters (38%), to persist only in stage 1 behaviors (19%), or to persist at stage 2 or 3 behaviors in one path (30%). In contrast, the oldest boys were least likely to be experimenters (28%), to persist only in stage 1 behaviors (10%), or to persist at stage 2 or 3 behaviors in one path (18%). The youngest boys, who had less time to diversify, were not often categorized in dual (11%) or triple (2%) pathways. With increasing age, the boys were more likely to persist in the more serious behaviors of multiple pathways. Most notably, the oldest boys were nine times more likely, and the middle boys six times more likely, to be in the triple authority conflict/covert/overt pathway than the youngest boys.

As boys age, they appear to continue to penetrate further in the developmental pathways. Many seem to become more persistent at increasingly serious and diversified types of disruptive and delinquent behaviors.

To what extent is a boy's escalation in one pathway associated with escalation in another? To explore this issue, the researchers combined the middle and oldest samples and closely examined boys who best fit the normative sequence of the pathway. The following are highlights of the findings from youth in more than one pathway:

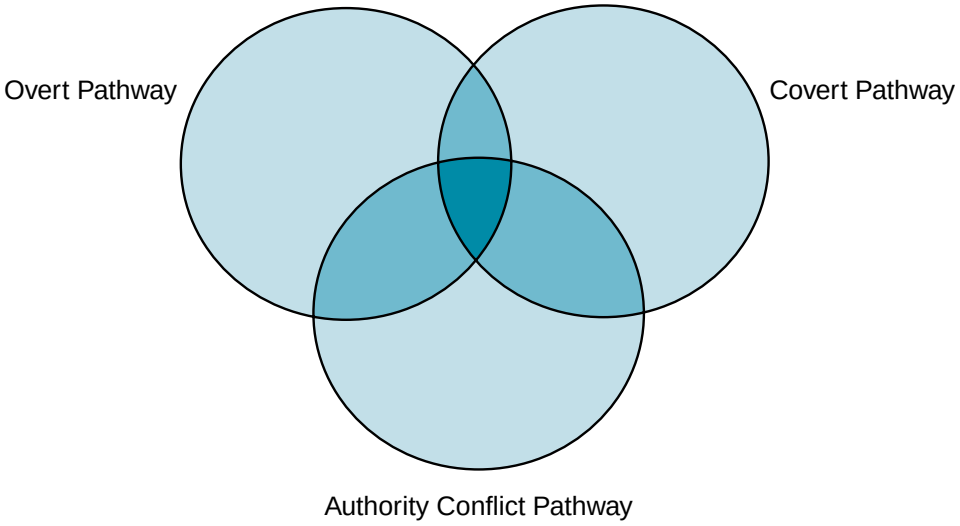
- Most of the boys who advanced to at least stage 2 in one pathway also had an onset of one or more behaviors in another pathway.
- Boys who reached more serious stages in the overt pathway were likely to advance in the covert pathway as well. For example, 80% of boys who escalated to violence in the overt pathway also progressed to serious delinquency in the covert pathway. In contrast, many boys who engaged in covert behaviors did not engage in any stages of the overt pathway.
- Among boys who had escalated to moderate and serious delinquency (stage 3) in the covert pathway, only about one-fifth also progressed to violence (stage 3) in the overt pathway.

Therefore, boys involved in advanced stages of disruptive behaviors were more likely than not to branch out into multiple pathways. One of the strongest predictable occurrences was that violent boys would also engage in serious nonviolent forms of delinquency.

Frequency of Offending Among Boys in Different Pathways

It is useful to know whether boys in certain pathways have a high rate of committing delinquent acts. The researchers hypothesized:

Figure 10: Single or Multiple Disruptive Pathways



- Boys in a single pathway of covert behavior would have a higher rate of delinquency than boys in a single pathway of overt behavior.
- Boys in covert/overt pathways would have a higher rate of delinquency than those in a single pathway.
- Boys in covert/overt/authority conflict pathways would have the highest rate of delinquency.

These hypotheses were tested against the data for the boys' average annual rates of court petitions and self-reported delinquency (Loeber et al., 1993; Loeber et al., in press). To increase the number of valid cases, subjects were classified into single or multiple pathways, regardless of the temporal order of their behaviors. Boys who previously were characterized as not fitting any pathway sequence were included if they met the general criteria of exhibiting serious pathway behaviors typical of stage 2 or stage 3. To control for possible confounding of higher rates of delinquency among boys in multiple pathways (who by definition had engaged in more than one incident of serious delinquent behavior), researchers subtracted the number of self-reported delinquent acts required for placement in each specific pathway.

Figure 12 (see page 16) presents self-report data for the oldest boys. Boys in the triple pathway reported an average of 65 delinquent offenses a year, with the highest rates of both violent and nonviolent offenses. Boys in the dual pathway of covert/overt behavior ranked second in the number of offenses, those in the dual pathway of covert/authority conflict ranked third, and those in the single pathway of covert behavior ranked fourth. These results reflect the more common occurrence of property (covert) than personal (overt) or status (authority avoidance) offenses in the general juvenile population.

It is important to note that boys who never progressed beyond stage 1 of any pathway reported very low offense rates during the prime delinquency ages of 13 to 16. The results, with some minor variations, were replicated in the youngest and middle samples. The findings indicate that as boys start to develop the disruptive and delinquent behavior characteristic of several pathways, their serious offense rate increases.

The findings on court records of delinquent involvement, not reported here in detail, reinforce the notion that boys in multiple pathways are at increased risk of being processed by the juvenile court for delinquent acts.

Accounting for High-Rate Delinquents

To what extent does the classification of experimenters and persisters according to less and more serious behaviors identify the majority of self-reported high-rate nonviolent and violent offenders? For this analysis, the researchers included all boys who reported that they had engaged in any of the developmental pathway behaviors. Because high-rate offending was most prominent in the middle and oldest samples, analyses focused on these groups.

Four groups of boys who demonstrated disruptive/delinquent behavior were identified: nonfitters in the prescribed pathway sequences, experimenters, persisters at stage 1 only, and persisters who had advanced to stages 2 or 3. Further, the researchers established four categories of high-rate offenders: the top 25% (in terms of offending rate) of boys who self-reported nonviolent offenses, the top 20% (in terms of offending rate) of the boys who self-reported violent offenses, all 22% of the boys who had a court petition filed for a nonviolent offense, and all 7% of the boys who had a court petition filed for a violent offense (oldest sample only).

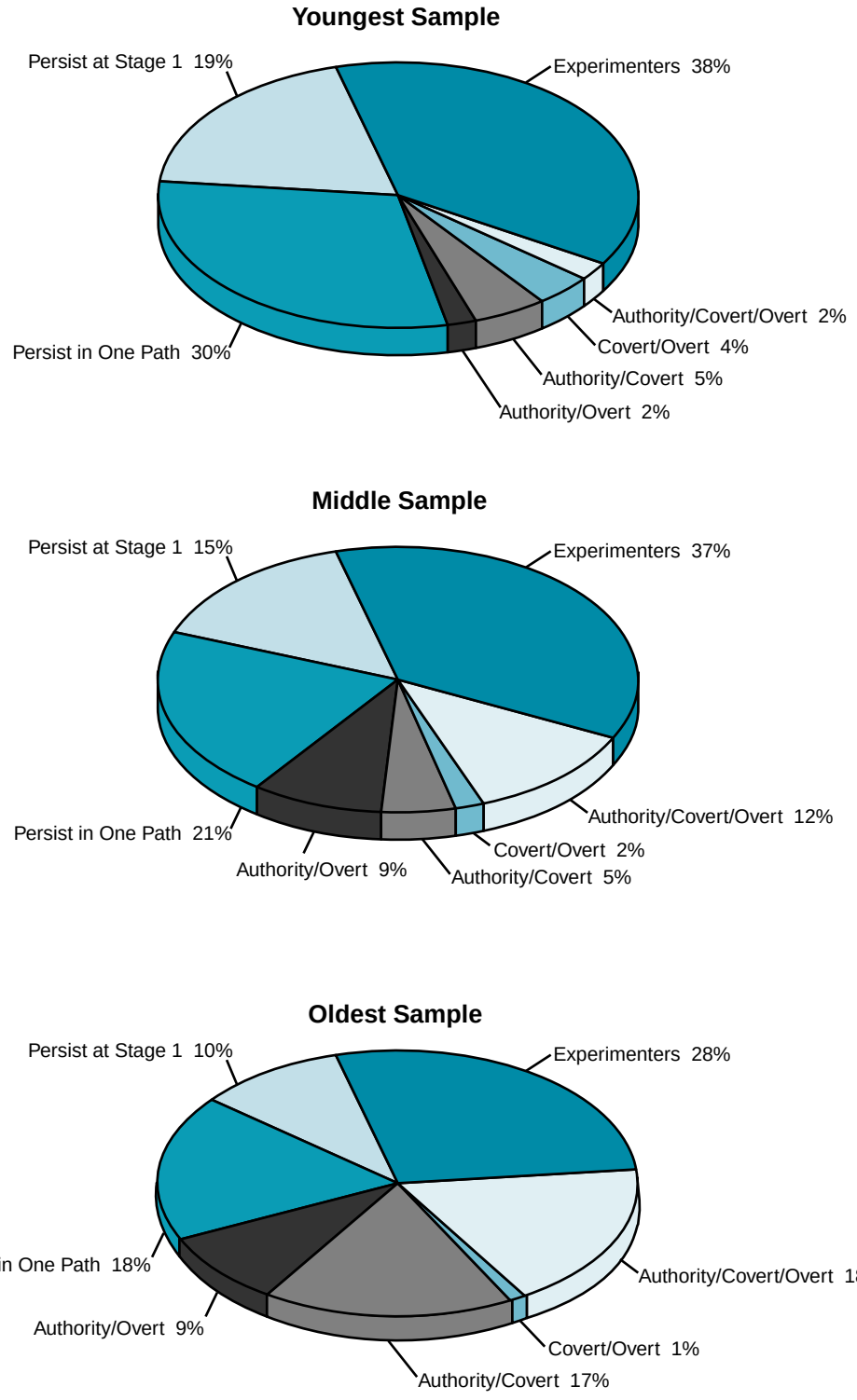
The researchers included the categories of nonfitters, experimenters, persisters at stage 1, and persisters at stage 2 or 3 to examine how well the developmental pathways accounted for the high-rate offenders.

As shown in figure 13 (see page 17), nonfitters, experimenters, and those who persisted in only stage 1 behaviors produced fewer of all four types of high-rate offenders than any of the boys in the persistent stage 2 or 3 category.

Approximately three-fourths of the high-rate offenders were boys who persisted in seriously disruptive behavior. Among the middle boys, nonfitters accounted for a small portion of the high-rate offenders. Youth who persisted in the advanced stages of the triple pathways were most likely to be high-rate offenders in self-reported nonviolence, self-reported violence, and court petitions for nonviolence. Persisters in the advanced stages of the overt/covert pathway were most likely to be involved in court petitions for violence. However, the dual pathway of covert/authority conflict was not significantly associated with self-reported violence.

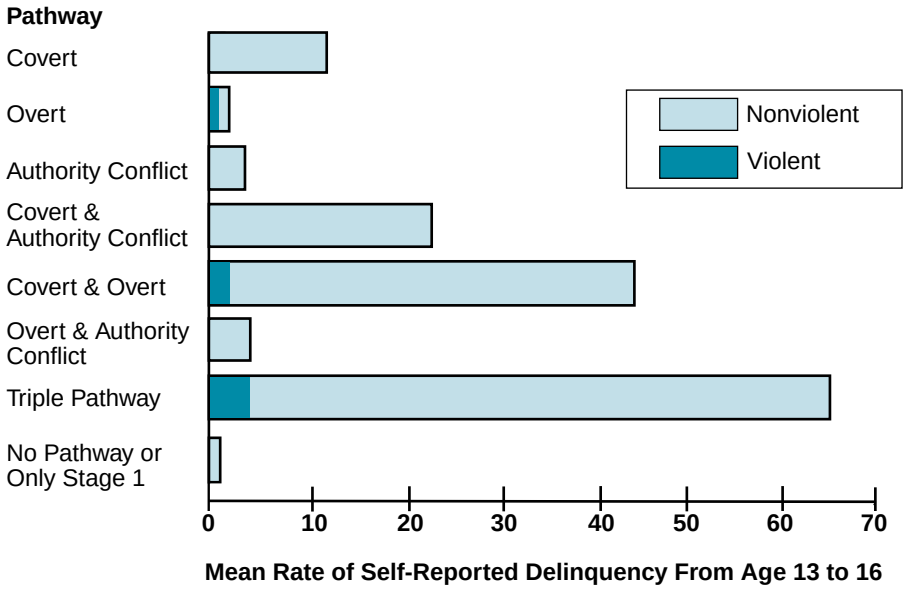
The developmental pathways model with classifications of persistence, variety, and severity proved useful in the analysis of violent and nonviolent delinquency rates and in the identification of high-rate violent and nonviolent offenders.

Figure 11: Distribution of Experimenters and Persisters in Single and Multiple Pathways



Note: Overt = Overt Pathway
Covert = Covert Pathway
Authority = Authority Conflict Pathway

Figure 12: Mean Annual Frequencies of Self-Reported Delinquency (of Oldest Boys in Stage 2 and/or Stage 3 of Each Pathway)



Demographic Characteristics of Persisters and Experimenters

The researchers investigated whether the demographic characteristics of the persisters were different from those of the experimenters. In each of the three pathways, the middle and oldest samples were separately compared regarding such factors as age, family socioeconomic status (SES), ethnicity, family structure (i.e., single-parent or two-parent household), and welfare status.

Significant differences between persisters and experimenters were found in both samples across the three pathways. Persisters were slightly older than experimenters, with an average difference of only 4 months (a difference that is statistically significant). In both samples, persisters were significantly more likely to come from economically disadvantaged families, as indicated by the family receiving welfare benefits or having a lower SES. However, the two groups did not differ on ethnicity or family structure (Loeber, Keenan, and Zhang, 1997).

Recurrence of Problem Behavior Among Persisters

The researchers also examined the frequency of problem behaviors and the period of latency, or inactivity, between reported episodes. The Pittsburgh Youth Study offered a rare opportunity to assess recurrence of problem behaviors at 6-month intervals of repeated measures.

Frequency of recurrence was measured by the number of assessment phases during which the problem behavior (within the same pathway and stage) was repeated. For instance, if a boy reported onset of vandalism in assessment B, he might report another stage 2 covert behavior, such as firesetting, in a future assessment.

For the middle sample, the pattern of recurrence was similar across the three developmental pathways. Overall, 70 to 80% of the persisters reported a recurrence in one or two phases, and few boys reported a recurrence across all phases. For example, of the boys who persisted in fighting, recurrence was reported by 55% at only one assessment phase, by 24% at two phases, by 14% at three phases, and by 7% at four phases. Also, 53% of violent behavior recurred in contiguous phases, 21% with a lag of one phase, 5% with a lag of two phases, and 21% with a lag of three phases. For the oldest sample, the corresponding distribution was 50% for contiguous phases, 18% for a lag of one phase, 21% for a lag of two phases, and 12% for a lag of three phases. Therefore, aggressive behavior was shown to recur following a 6- to 18-month hiatus. The only significant differences between the middle and oldest samples in the frequency of recurrence was in the authority conflict pathway, in which the oldest sample reported a significantly higher frequency of recurrence than the middle sample.

Latency to recurrence was examined by counting the number of inactive phases between those in which problem behavior was reported. With the exception of stubborn behavior in the middle sample and fighting in both the middle and oldest samples, 75 to 90% of the persistent problem behavior occurred in contiguous phases or with a lag of only one interval.

The researchers repeated this analysis on frequency of and latency to recurrence, comparing African-American and Caucasian boys. The only significant difference found was the middle sample's frequency of authority avoidance—African-American boys were more likely than Caucasian boys to engage in authority avoidance in more than three phases.

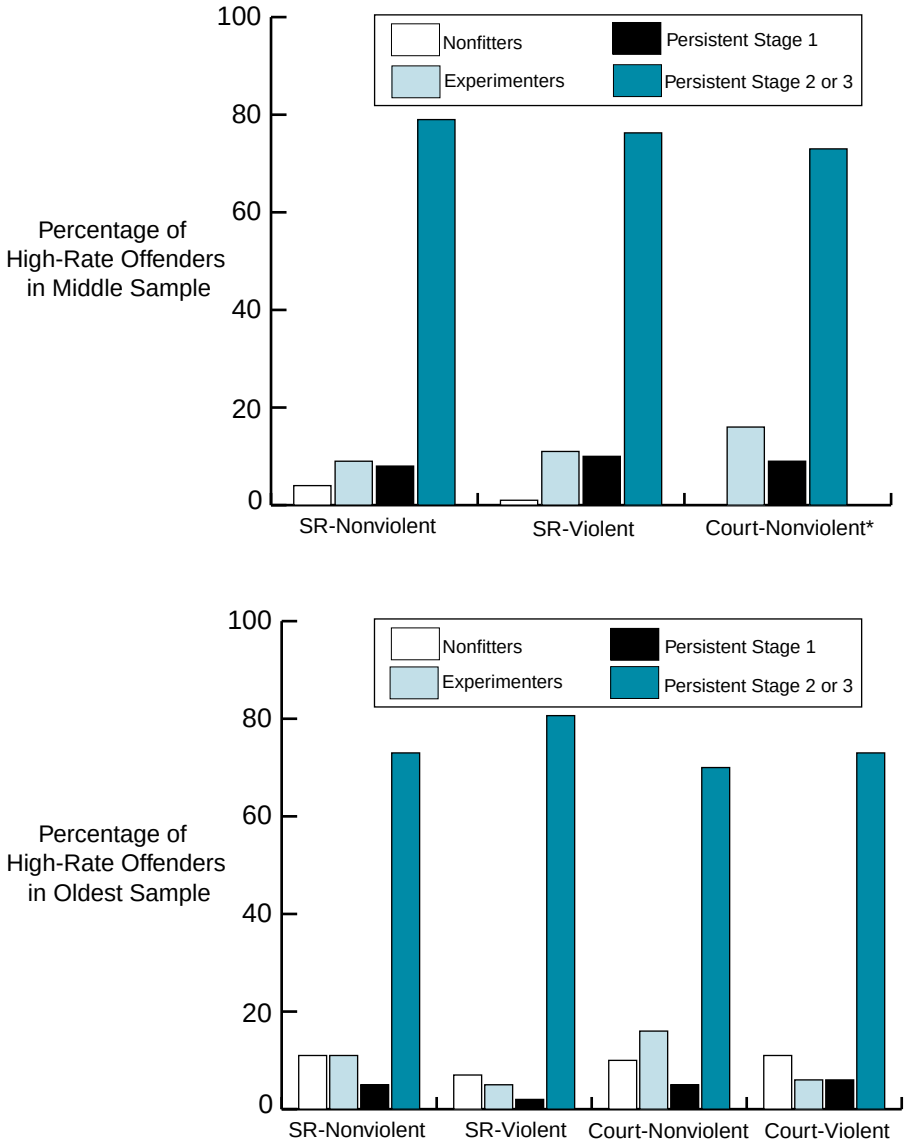
Most boys continued their problem behaviors for one or two additional 6-month assessment phases. Persistent boys were most likely to either remain active in contiguous reporting phases or pause for one interval. Longer periods of latency were more commonly observed among boys persisting in aggressive behavior.

Discussion

This Bulletin provides a synthesis of years of research leading to the postulation and testing of a theoretical model for child and adolescent development of disruptive behaviors along orderly, progressively more serious pathways. Three pathways were found to be better than one in terms of clarifying the dynamic escalation of severity along the continuums of covert, overt, and authority conflict behaviors. Replications of the pathways in other data sets have been reported by Tolan and Gorman-Smith (in press). It is not yet clear to what extent the pathways apply to girls.

The strength of this pathways model is in large part due to the researchers' sensitivity to the developmental realities of life for children and adolescents. Age-appropriate developmental tasks must be mastered before an individual child can successfully progress to the next level of challenges. Not all problem behaviors emerge at the same developmental stage. A key to the identification of stages within the pathways model is documenting the age of onset for specific disruptive behaviors.

Figure 13: Percentage of High-Rate Offenders Captured by Pathways in the Middle and Oldest Samples



SR = Self-Report
Court = Court Offenses

* **Note:** In the middle sample, the percentage of nonfitters who were high-rate offenders in court petitions for nonviolence was zero.

The pathways represent developmentally formulated stages that are sensitive to both age-appropriate manifestations of problem behavior and increases in severity, with each stage of the pathway serving as a stepping stone toward more serious behaviors. Each of the three hypothesized pathways can be thought of as representing different developmental tasks:

- The overt pathway represents aggression, as opposed to positive social problem solving.
- The covert pathway represents lying, vandalism, and theft, as opposed to honesty and respect for property.
- The authority conflict pathway represents conflict with and avoidance of authority figures, as opposed to respect for authority figures.

This conceptualization implies that youth who master one developmental task, such as honesty, will not necessarily master another. Some youth may fail to accomplish several of the critical developmental tasks. Therefore, pathways in disruptive behavior can be viewed as different lines of development with some multiproblem boys progressing on several pathways at the same time.

What are the implications of developmental pathways for the prevention of disruptive and delinquent behavior? First, age-appropriate strategies must be devised to assist children in mastering key developmental tasks. For instance, to avoid onset of the overt pathway, children must learn to control aggressive outbursts and use words, rather than fists, to resolve problems. However, tasks that appear to be directly linked to the overt, covert, and authority conflict pathways cannot be the sole focus. Child development cannot be neatly compartmentalized, so a holistic approach must be followed to meet the needs, identify the interests, and foster the strengths of the total person.

Second, the warning signs of early onset of disruptive behaviors must not be dismissed with a "this too will pass" attitude. Interventions will be more successful if the child has not already persistently performed a negative behavior or penetrated the more serious stages of a pathway.

How can children at risk for pathway onset and penetration be efficiently identified? Each child should be approached from a developmental perspective. Is the child exhibiting appropriate behavior for his developmental stage? Are there knowledgeable individuals in the child's life who could help in determining risk? Several of the instruments employed in this research can also be administered to parents and teachers to help identify those children exhibiting risk factors for problem behaviors. Factors to examine include how often a child is disruptive, with what intensity and provocation he exhibits disruptive behavior, and whether the behavior occurs in multiple settings. This research indicates that a child who only experiments with disruptive behavior is at far less risk for progressing along the pathway than a child who persists in practicing negative behaviors.

When screening at-risk children for possible interventions, practitioners should consider utilization of a

multiple-gating design (Loeber, Dishion, and Patterson, 1984). This cost-effective screening procedure is based on techniques commonly used in personnel selection. As shown in figure 14, the least expensive screening procedure is first applied to the full sample of at-risk children, such as having teachers complete a checklist of early problem behaviors at school in the first gate. Based on red flags from the teacher's screening, a more expensive screening involving telephone interviews could be conducted with mothers in the second gate to gather information on problem behavior at home. For the smaller group of children still considered at high risk after the second gate, even more intensive home observations could be conducted to gather information on parents' child-rearing practices in the third gate. With a multiple-gating design, the assessment of progressions in developmental pathways and disruptive behavior in multiple settings, frequency, and variety can all be incorporated in the screening process.

Once a parent, teacher, or other caretaker is aware of a child's propensity for disruptive behavior, help should be sought as soon as possible. Research on the oldest sample (Stouthamer-Loeber et al., 1995) indicated that the development of disruptive and delinquent behaviors was largely left unchecked among a population of eighth grade boys. Problem behavior had been exhibited for an average of 6 years by boys who had committed delinquent acts. Only 41% of these boys' parents had ever sought help from anyone, including friends, family members, or professionals. By the eighth grade, only 20% of the delinquent boys had been in contact with the juvenile court. The researchers concluded that the majority of the delinquent boys experienced uninterrupted delinquent careers. Clearly, parents need to be informed about their children's potential progression into more serious behaviors and about any available community services.

Teachers come into direct contact with most at-risk children. Teachers often observe problem behaviors in the classroom, the cafeteria, and on the playground and frequently are the first to refer children for assessments for ADHD, other conduct disorders, and specific learning disabilities. A child's failure to experience academic success can often accompany behavioral problems. A child's progression along developmental pathways can have negative consequences for his educational advancement and for the overall learning climate in the classroom. Teachers play a critical role in communicating problems to the child and his parents, instituting classroom interventions, and providing referrals to appropriate resource personnel or agencies. Schools may need to implement educational reforms that focus on students at risk for disruptive behavior (Montgomery and Rossi, 1994).

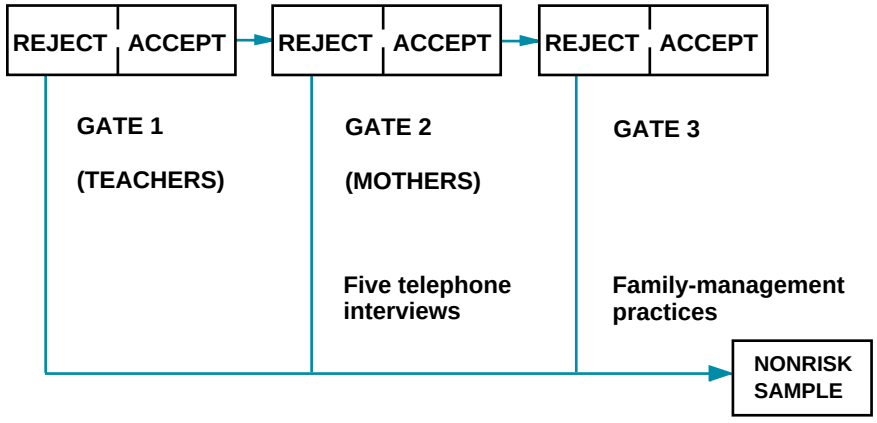
Mental health and juvenile justice practitioners have much to contribute by working together to redirect disruptive children back on the track of positive development. Often, the same children are given a psychiatric diagnosis of mental health problems and are processed in the juvenile justice system.

OJJDP recently initiated the Mental Health/Juvenile Justice Initiative. Under this initiative, OJJDP supports a number of projects to enhance collaboration between the mental health and juvenile justice systems:

- The Institute of Law, Psychiatry, and Public Policy at the University of Virginia is utilizing the multidisciplinary perspectives of law, developmental psychology, and clinical assessment to examine adjudicative competence and maturity in juvenile offenders.
- OJJDP is working with the National Institute of Mental Health on a research study examining multimodal intervention for children with ADHD. This study will evaluate the long-term efficacy of stimulant medication and intensive behavioral/educational treatment, alone and in combination, for the treatment of children with ADHD. Followup measures with the 576 children enrolled in the study will assess other possible negative outcomes of ADHD, such as substance abuse, precriminal activities, delinquent behavior, and juvenile justice system contacts.
- The Center for Mental Health Services is supporting comprehensive system-integrated delivery of mental health services for children and youth in 32 communities across the country. OJJDP is providing resources for technical assistance to assist these communities in the improvement of services to youth in the juvenile justice system.
- OJJDP is supporting the development of technical assistance resources for implementation of programs that address coexisting behaviors, such as drug use and mental health problems, with youth in the juvenile justice system.

These efforts are designed to deal with children already exhibiting problem behavior or delinquency. OJJDP is also providing partial support for the Risk Reduction Via Promotion of Youth Development project. This is a large-scale intervention project designed to promote

Figure 14: Multiple Gating Design for a Three-Gate Screening Procedure



Source: Loeber, Dishion, and Patterson, 1984.

coping competence and to reduce risk for conduct problems, substance use, aggression, delinquency, and school failure beginning in early elementary school. It includes a classroom program, a schoolwide conflict management program, peer social skills training, and home-based family programming. The project also seeks to alter home and school climates to reduce the risk of adverse outcomes and to promote positive youth development.

These programs have much to offer in terms of reaching out to families of at-risk youth, intervening with disruptive boys, advancing practices in dealing with mental health concerns in the juvenile justice system, and fostering a climate for positive youth development.

Researchers at the Pittsburgh Youth Study continue to follow up with the youngest and oldest boys (the middle sample is not being followed up) to learn how their lives unfold and how they progress in the developmental pathways of disruptive and delinquent behavior. Future analyses will focus on examining factors in the boys' lives that increase the risk of pathway onset, penetration, and persistence. Attention will also be paid to the influence of community factors and peer influences.

An important finding from these analyses is the latency period that occurs between physical fighting or violent episodes. Extensive periods of inactivity may surface as the boys provide additional data waves for analysis. In the meantime, interventions targeting violent juvenile offenders cannot be of short duration. Furthermore, followup timeframes for measurement of recidivism among violent juveniles must be more extensive than the latency periods of 6 to 18 months identified in this study. Children's behavior is not readily remolded and reshaped; the years of developmental pathways that led to the emergence of the present behavior must be considered.

Each child has a lengthy course of development, and there are rarely quick fixes that will redirect a child on the pathway to positive development. This country must make a long-term commitment to each and every child and be prepared to stand beside them when they face difficult challenges and need nurturance and guidance. Before children can change unacceptable behavior, they must be shown how. This is truly the developmental task that challenges the evolving society in the United States today.

References

American Psychiatric Association. 1985. *Diagnostic and Statistical Manual of Mental Disorders: Third Edition, Revised; DSM–III.* Washington, DC: American Psychiatric Association.

American Psychiatric Association. 1994. *Diagnostic and Statistical Manual of Mental Disorders: Fourth Edition; DSM–IV.* Washington, DC: American Psychiatric Association.

Cicchetti, D. 1990. An historical perspective on the discipline of developmental psychopathology. In *Risk and Protective Factors in the Development of Psychopathology,* edited by J. Rolf, A. Masten, D. Cicchetti, K. Neuchterlein, and S. Weintraub. New York: Cambridge University Press.

Elliott, D.S. 1994. Serious violent offenders: Onset, developmental course, and termination—The American Society of Criminology 1993 Presidential address. *Criminology* 32:1–21.

Frick, P.J., Lahey, B.B., Loeber, R., Tannenbaum, L., Van Horn, Y., Christ, M.A.G., Hart, B.A., and Hanson, K. 1993. Oppositional defiant disorder and conduct disorder: A meta-analytic review of factor analyses and cross-validation in a clinic sample. *Clinical Psychology Review* 13:319–340.

Hart, E.L., Lahey, B.B., Loeber, R., Applegate, B., and Frick, P.J. 1995. Developmental change in attention-deficit hyperactivity disorder in boys: A four-year longitudinal study. *Journal of Abnormal Child Psychology* 23:729–749.

Hinshaw, S.P. 1987. On the distinction between attentional deficits/hyperactivity and conduct problems/aggression in child psychopathology. *Psychological Bulletin* 101:443–463.

Huizinga, D. 1995. Developmental sequences in delinquency. In *Pathways Through Adolescence: Individual Development in Context,* edited by L. Crockett and N. Crowder. Mahwah, NJ: Lawrence Earlbaum Associates.

Huizinga, D., Loeber, R., and Thornberry, T.P., eds. 1993. *Urban Delinquency and Substance Abuse: Technical Report.* Washington, DC: U.S. Department of Justice, Office of Justice Programs, Office of Juvenile Justice and Delinquency Prevention.

Le Blanc, M., Côté, G., and Loeber, R. 1991. Temporal paths in delinquency: Stability, regression and progression analyzed with panel data from an adolescent and a delinquent male sample. *Canadian Journal of Criminology* (January):23–44.

Leone, P.E., Rutherford, R.B., and Nelson, C.M. 1991. *Juvenile Corrections and the Exceptional Student, ERIC Digest #E 509.* Reston, VA: The Council for Exceptional Children.

Loeber, R. 1990. Development and risk factors of juvenile antisocial behavior and delinquency. *Clinical Psychology Review* 10:1–41.

Loeber, R. 1991. Questions and advances in the study of developmental pathways. In *Rochester Symposium on Developmental Psychopathology: III,* edited by D. Cicchetti and S. Toth. Rochester, NY: Rochester University Press.

Loeber, R., DeLamatre, M., Keenan, K., and Zhang, Q. In press. A prospective replication of developmental pathways in disruptive and delinquent behavior. In *The Individual as a Focus in Developmental Research,* edited by R. Cairns. Thousand Oaks, CA: Sage Publications, Inc.

Loeber, R., Dishion, T.J., and Patterson, G.R. 1984. Multiple gating: A multistage assessment procedure for identifying youths at risk for delinquency. *Journal of Research on Crime and Delinquency* 21:7–32.

Loeber, R., and Hay, D.F. 1994. Developmental approaches to aggression and conduct problems. In *Development Through Life: A Handbook for Clinicians,* edited by M. Rutter and D.F. Hay. Oxford, England: Blackwell Scientific Publications.

Loeber, R., Keenan, K., and Zhang, Q. 1997. Boys' experimentation and persistence in developmental pathways toward serious delinquency. *Journal of Child and Family Studies* 6:321–357.

Loeber, R., and Schmaling, K. 1985. Empirical evidence for overt and covert patterns of antisocial conduct problems. *Journal of Abnormal Child Psychology* 13:337–352.

Loeber, R., Stouthamer-Loeber, M., and Green, S.M. 1991. Age at onset of problem behavior in boys, and later disruptive and delinquent behaviors. *Criminal Behavior and Mental Health* 1:229–246.

Loeber, R., Stouthamer-Loeber, M., Van Kammen, W.B., and Farrington, D.P. 1991. Initiation, escalation and desistance in juvenile offending and their correlates. *Journal of Criminal Law and Criminology* 82:36–82.

Loeber, R., Wung, P., Keenan, K., Giroux, B., Stouthamer-Loeber, M., Van Kammen, W.B., and Maughan, B. 1993. Developmental pathways in disruptive child behavior. *Development and Psychopathology* 5:103–133.

Montgomery, A., and Rossi, R. 1994. *Educational Reforms and Students at Risk: A Review of the Current State of the Art.* Washington, DC: U.S. Government Printing Office.

Stouthamer-Loeber, M., Loeber, R., Van Kammen, W., and Zhang, Q. 1995. Uninterrupted delinquent careers: The timing of parental help-seeking and juvenile court contact. *Studies on Crime and Crime Prevention* 4:236–251.

Tolan, P.H., and Gorman-Smith, D. In press. Development of serious and violent offending careers. In *Serious and Violent Juvenile Offenders: Risk Factors and Successful Interventions*, edited by R. Loeber and D.P. Farrington. Thousand Oaks, CA: Sage Publications, Inc.

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