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The Effects of the Fast Track Preventive Intervention on the Development of Conduct Disorder Across Childhood

Conduct Problems Prevention Research Group

The impact of the Fast Track intervention on externalizing disorders across childhood was examined. Eight hundred-ninety-one early-starting children (69% male; 51% African American) were randomly assigned by matched sets of schools to intervention or control conditions. The 10-year intervention addressed parent behavior-management, child social cognitive skills, reading, home visiting, mentoring, and classroom curricula. Outcomes included psychiatric diagnoses after grades 3, 6, 9, and 12 for conduct disorder, oppositional defiant disorder, attention deficit hyperactivity disorder, and any externalizing disorder. Significant interaction effects between intervention and initial risk level indicated that intervention prevented the lifetime prevalence of all diagnoses, but only among those at highest initial risk, suggesting that targeted intervention can prevent externalizing disorders to promote the raising of healthy children.

Prevention science in serious antisocial behavior promises to contribute to the raising of healthy children by drawing on theory and findings in developmental science. Moffitt's (1993) early-starter model of life-persistent antisocial behavior targets a group of children whose conduct problems begin early in life and grow into serious violence that persists across the life span. The human and financial costs of these youth are staggering: Cohen (2005) estimates the lifetime cost of a career criminal at over $2 million. Willingness-to-pay surveys indicate that the American public would pay to support the raising of these high-risk children as healthy citizens *if* the efforts could be shown to be effective.

In response, numerous prevention programs have been developed that target early-starting, high-risk children, albeit with mixed success (Dodge, Coie, & Lynam, 2006). One such program, called Fast Track, is based on a consensus developmental model of conduct disorder (CD; Conduct Problems Prevention Research Group [CPPRG], 1992). This long-term intervention program has been implemented and evaluated through a randomized controlled trial that has revealed positive impacts on children during childhood (CPPRG, 1999a, 2002a, 2004, 2007). Numerous questions remain about the impact of Fast Track, however, including its long-term preventive impact after intervention ceases and whether intervention effects grow or diminish over time. These prevention science questions have implications for the developmental science of antisocial behavior. The goal of the current study is to evaluate the 12-year impact of the Fast Track intervention to contribute to the developmental science of antisocial behavior and to inform the role of preventive intervention in public policy toward raising healthy children.

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A Dynamic Cascade Model of Antisocial Behavioral Development

Although seriously violent adolescents can be identified with some precision by the time children enter elementary school (called early-starters; Moffitt, 1993), growth from minor conduct problems into serious violence depends on transaction with the environment across childhood (CPPRG, 1992). Dodge, Greenberg, Malone, and the CPPRG (2008) propose that the toddler with biologically based difficulties in impulse control and behavioral regulation is likely to encounter parents who have difficulty with behavior management of that child, especially if those parents live in a disadvantaged social-ecological context and are able to spend relatively less time on the child's skill development. The child's difficult temperament may grow into conduct problems at home, which keep the child from learning necessary social-cognitive and cognitive skills. Not surprisingly, when the high-risk child enters school, he or she is likely to experience social rejection from peers (Dodge et al., 2003), failure in academic tasks (reviewed by Dodge, Coie, et al., 2006), and conflict with frustrated teachers (Stormshak et al., 2000). These failure experiences lead the child toward a defensive style of processing information about the social world (Dodge, Bates, & Pettit, 1990) and disengagement from the mainstream groups in life, including classroom peers, school institutional activities, and parents. Parents may withdraw from interaction with their child to relieve conflict and tension. As the child grows into adolescence, there is nobody to monitor and supervise the child, and so he or she may gravitate toward deviant peer groups and accelerate antisocial behavior into serious violence (Dodge, Coie, et al., 2006).

This transactional cascade model has similarities with the confluence model proposed by Dishion, Patterson, and Griesler (1994) and the child-by-environment perspective by Ladd (2003). It has received empirical support (Dodge et al., 2008) and replication with an independent sample (Dodge, Malone, et al., 2006). Although it embraces the likelihood that genetic vulnerabilities ignite the chain of development, it also posits the crucial role that the environment plays in interaction and transaction with the child.

The Fast Track Intervention and Randomized Controlled Trial

This model implies that strategic preventive intervention might yield positive impacts on even (or mostly) the highest risk, early-starting child. CPPRG (1992) suggested that prevention should start as soon as high-risk children can be identified in school. It should be multifaceted because risks can arise from family, peer, school, and community domains. It should be sustained across development because, again, although early risks elicit later risks, new risks can also arise de nouveau. Indeed, several prevention programs that have incorporated these principles have reported positive impact on antisocial behavior and delinquency, including Anger Coping (Lochman & Wells, 2004), the Montreal Program (Vitaro, Brendgen, Pagani, Tremblay, & McDuff, 1999), and the Incredible Years Program (Webster-Stratton, Reid, & Stoolmiller, 2008). However, none of these programs targeted the highest risk group of early starters who are at greatest risk for serious violence and for whom the prospect of successful prevention is most daunting and potentially most beneficial. The contrasting hypothesis is that early-starting children are inevitably destined for CD outcomes, and that although intervention might temporarily scaffold them to avoid antisocial opportunities, when intervention ceases their CD will become evidenced.

These intervention concepts formed the basis for the Fast Track Prevention Program for high-risk youth, a multisite, multicomponent intervention program targeting those children at the highest risk for life-course-persistent conduct problems (CPPRG, 1992). The intervention targeted the primary risk factors for antisocial behavior identified in the developmental model: poor parental behavior management, deficient child social-cognitive and emotional coping skills, poor peer relations, weak academic skills, disruptive and rejecting classroom environments (through curricula directed toward peers and teacher consultation), poor parental monitoring and supervision, poor home–school relations. Moreover, the intervention was implemented across a 10-year period from 1st through 10th grades so that risk factors could be targeted at the time in development when they were most operative.

The efficacy of the intervention has been evaluated through a randomized controlled trial in which the population of children was screened and then high-risk children were randomly assigned by school to intervention or control. Outcome analyses indicated that random assignment to the program had a significant main-effect impact on the proximal targets of intervention that were assessed in the elementary school phase of the project. Relative

to controls, intervention children displayed significantly greater improvements in behavior (increased compliance and prosocial behavior by parent and teacher report) and significantly lower rates of aggressive, oppositional behaviors at school (by teacher report; CPPRG, 1999a). Improvements in parenting were evident on warmth (by observer report), reduced use of physical punishment (by parent report), and improved parental involvement at school (by teacher report). The classrooms of intervention children were characterized by children with more social competence and tolerance (CPPRG, 1999b). Intervention children displayed stronger word attack skills and higher language arts grades, lower rates of special education service use (according to school record review), more positive peer interactions (by observer ratings), higher social preference (by sociometric nominations), and improved social-cognitive and emotion skills (assessed by child interviews).

At the end of third grade, intervention children displayed fewer conduct problems (by teacher and parent report), and parents reported less use of physical punishment and greater improvements in their parenting skills (CPPRG, 2002a). Children assigned to the Fast Track preventive intervention were significantly less likely to be identified as clinical cases in person-centered analyses than were children in the control group (63% vs. 73%, respectively).

In fourth and fifth grades, the intervention had significant main-effect impact on children's social competence and social-cognition problems, problems with deviant peers, and conduct problems in the home and community (CPPRG, 2004). Intervention effects faded during middle school, with effects only on parent reports of CD in sixth grade (CPPRG, 2007) and parent-rated hyperactive behaviors and self-reported delinquent behaviors in seventh grade (CPPRG, in press).

By ninth grade, the intervention had a significant impact on psychiatric CD diagnoses but only among the highest risk group of children (CPPRG, 2007). Significant interaction effects between intervention and initial risk level were found after Grades 3 and 6, but most strongly after Grade 9. Among the highest risk group (top 3%) in Grade 9, assignment to intervention was responsible for preventing 75% of CD cases, 53% of attention deficit hyperactivity disorder (ADHD) cases, and 43% of any disruptive behavior disorder cases. By contrast, the intervention had no impact on the diagnoses of children who were initially at only moderate levels of risk. A similar interaction effect was obtained with an antisocial behavior score based on the youth's self-report (although there was also a positive main effect of intervention). The sustained positive effect of intervention on diagnoses of CD among the highest risk youth is remarkable for its longevity, 9 years. However, the intervention was still ongoing in the 9th year, and no study has yet evaluated whether intervention can prevent CD in this highest risk group after the intervention ceases.

Models of Prevention Across Development

These findings and various models of how prevention might affect the normal course of antisocial development invite three questions posed in the current study. The first question concerns the criterion used to define an ''early starter,'' specifically, the relation between continuous measures of early risk and ultimate CD outcome. If the relation is linear, then identification of a cutoff for selection into preventive intervention will be arbitrary. If the relation is nonlinear and accelerating, then a cutoff for selection might be defined by the point of steepest slope. In Fast Track, risk was assessed through parent and teacher ratings during kindergarten, which were combined into a continuous risk score to which a dichotomous cutoff score was applied to select children for eligibility into the prevention program evaluation. Identifying an optimal cutoff score depends on the slope of the risk-outcome curve as well as interactions between risk and intervention efficacy. The first goal of the current study was to map the risk-outcome curve in the population.

Second, because all of the earlier mentioned positive effects of the Fast Track intervention were evidenced while the intervention was still in progress, it is not clear that its impact would be sustained after the intervention ceased. If the intervention merely scaffolds the adjustment of highest risk youth while they remain in the intervention, then removal of the intervention would be followed by dilution of effects over time or even a ''rebound effect'' in which, during the period after the intervention ceases, the intervention group presents more new cases than the control group. This pattern is depicted in the bottom left figure in Figure 1 as a temporary scaffolding model. The rebound effect occurred in the Project Northland trial, in which positive effects of random assignment to intervention were evident in Grades 6–8 (Perry et al., 1996), but after the intervention stopped after Grade 8, during the Grades 9–10 period, the intervention group displayed *higher* rates of

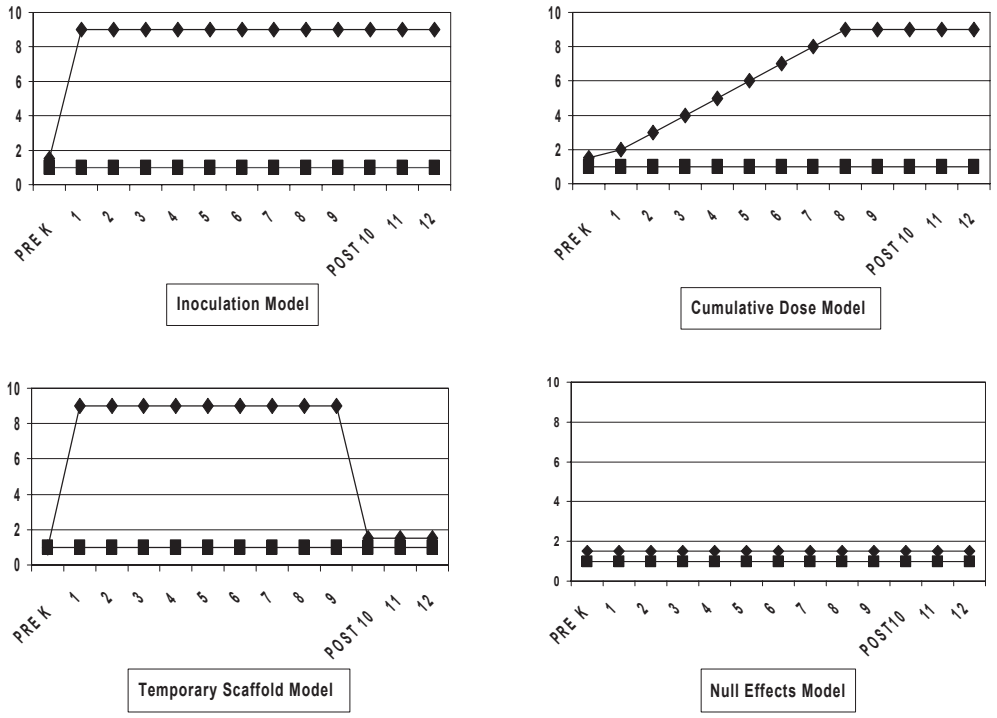

Figure 1. Hypothesized developmental models of prevention.

problem behavior than controls (Perry et al., 2002). When the intervention was resumed in Grades 11 and 12, positive effects on outcomes resumed as well (Perry et al., 2007). On the other hand, if a true preventive effect of Fast Track occurs, then positive outcomes would be sustained even after the intervention ceases. The current study tested effects over the 2-year period after the intervention ended.

The third question concerns the timing of intervention effects, which is not clear from the earlier-mentioned reports. It is plausible that all of the positive effect of the intervention occurred during the earliest years, and subsequent years of the intervention sustained these effects but did nothing more to enhance effects. This pattern is depicted in the top left portion of Figure 1 as an inoculation model because an initial dose ''inoculates'' the child against later bad outcomes. A third model follows more closely from predictions from the dynamic cascade model. This model posits modest positive effects at every year that cumulate over time to a large effect, depicted in the top right portion of Figure 1 as a cumulative effects model. All of these models are contrasted with a model of no effect at all, depicted in the bottom right portion of Figure 1.

The current study employed discrete time hazard analysis to test the timing of effects on the onset of new cases of disorder. With time (year) entered as a within-subject factor in hazard analyses, one can test main effects of the intervention (across all years combined) as well as interactions between the intervention and year of outcome. Main effects with no interaction effect would indicate cumulative effects because a similar-size new effect occurs every year on those individuals who had not been affected previously. An interaction effect would indicate that the new effect size differs across years of the intervention, consistent with an inoculation or scaffolding model.

Method

Participants

Four geographic sites were selected for the study: Durham, North Carolina, a small city with a large low-income population that is primarily African American; Nashville, Tennessee, a moderate-sized city with a mix of low- to middle-income and African American and European American population; Seattle, Washington, a moderate-sized city with a low to middle ethnically diverse population; and central Pennsylvania, a mostly rural area with low- to middle-income European American population. These sites varied widely in ethnicity (most minorities were African American, with some

Latino) and poverty (as measured by free or reduced lunch rates) as follows: Durham, North Carolina, 90% minority and 80% reduced lunch; Nashville, Tennessee, 54% minority and 78% reduced lunch; rural Pennsylvania; 1% minority and 39% reduced lunch; and Seattle, Washington, 52% minority and 46% reduced lunch.

''High-risk'' schools within each site (12 in Durham, 9 in Nashville, 18 in Pennsylvania, and 16 in Seattle) were selected based on crime and poverty statistics of the communities that they served. Within each site, schools were divided into one to three paired sets matched for demographics (size, percentage free or reduced lunch, and ethnic composition), and one set within each pair was randomly assigned to intervention and one to control condition. Students at these elementary schools moved into middle school at Grade 5, 6, or 7.

A multiple-gating screening procedure (Lochman & CPPRG, 1995) that combined teacher and parent ratings of disruptive behavior was applied to all 9,594 kindergarteners across three cohorts (1991–1993) in these 55 schools. Children were screened initially for classroom conduct problems by teachers, using the Teacher Observation of Child Adjustment–Revised (TOCA–R) Authority Acceptance Score (Werthamer-Larsson, Kellam, & Wheeler, 1991). Those children scoring in the top 40% within cohort and site were then solicited for the next stage of screening for home-behavior problems by the parents, using a novel 22-item instrument that included items from the Child Behavior Checklist (Achenbach, 1991a), the Revised Behavior Problem Checklist (Quay & Peterson, 1987), and novel items that we created for this study. Ninety-one percent (n = 3,274) completed the home-behavior screen. The teacher and parent screening scores were then standardized within site, based on screening a representative sample of approximately 100 children within each site (which also served as a normative comparison), and then summed to yield a total *severity-of-risk screen score*.

Children were selected for inclusion into this study based on this screen score, moving from the highest score downward until desired sample sizes were reached within sites, cohorts, and conditions. Exceptions to this inclusion rule were made when a child failed to matriculate in the first grade at a core school (n = 59) or refused to participate (n = 75), or to accommodate a superceding rule that no child would be the only female in an intervention group. The outcome was that 891 children (ns = 445 for intervention and 446 for control) participated. Note that the screen score and percent of population selected are defined relative to other children in these high-risk schools. On the kindergarten Teacher's Report Form of the Child Behavior Checklist (Achenbach, 1991b), which provides national norms, the average externalizing T score (available for 88% of the high-risk sample) was 66.4, and 76% of these children scored 60 or higher.

The mean age of participants was 6.5 years (SD = 0.48) at the time of identification. Across all sites, the sample primarily comprised African American and White participants (51% African American, 47% European American, and 2% Other ethnicity, e.g., Pacific Islander and Hispanic) and gender mixed (69% boys). The sample was skewed toward socioeconomic disadvantage: Fifty-eight percent were from single-parent families, 29% of parents were high school dropouts, and 40% of the families were in the lowest socioeconomic class (representing unskilled workers) as scored by Hollingshead (1975). Only 32% of the sample was within the middle-class range (Hollingshead Categories 2 and 3), in comparison to rates of up to 75% in these two categories in some community samples (e.g., Reinherz, Tanner, Berger, Beardslee, & Fitzmaurice, 2006). In addition to the high-risk sample, a stratified normative sample of 387 children was identified from the control schools to represent the population-normative range of risk scores (based on teacher ratings only) and was followed over time.

Written consent from parents and oral assent from children were obtained. Parents were paid for completing interviews, and intervention group parents were paid for group attendance. All procedures were approved by the Institutional Review Boards of participating universities.

To improve the precision of the estimates of intervention effects, 20 variables were measured prior to the initiation of intervention and are included as covariates in outcome analyses. These variables are described in detail by CPPRG (2007) and are: (a) parent daily report of oppositional and aggressive behaviors, (b) TOCA–R Authority Acceptance Scale Score, (c) family Hollingshead socioeconomic status, (d) CES–D Maternal Depression Scale, (e) mother-rated family satisfaction scale, (f) mother-rated friendship satisfaction scale, (g) maternal Stressful Life Events Scale, (h) neighborhood dangerousness rating, (i) WISC Intelligence score, (j) hostile attributional bias score, (k) aggressive response to social problems score, (l) interview on emotional experience score, (m) parent-rated social competence scale, (n) Woodcock–Johnson Letter Word Identification Score, (o) emotion

recognition score, (p) social problem solving score, (q) parent-reported appropriate discipline, (r) parent-reported physical punishment of child, (s) parent-reported verbal punishment of child, and (t) directly observed parental warmth toward child. Instruments and items are described at http://www.fasttrackproject.org. Previous analyses confirm no statistical difference between the intervention and control samples for preintervention scores (CPPRG, 2002a, 2007).

Intervention Procedures

Elementary school phase (Grades 1–5). During the elementary school phase of the intervention (Grades 1–5), all families were offered parent training with home visiting, academic tutoring, and child social skills training. Parent and child group interventions were conducted during a 2-hr ''enrichment program.'' These sessions include social skill training ''friendship groups'' led by educational coordinators for high-risk children (Bierman et al., 1996), parent-training groups for parents led by family coordinators, and guided parent–child interaction sessions (parent–child sharing time; McMahon, Slough, & CPPRG, 1996). In first grade, paraprofessional tutors also provided three 30-min periods, along with a weekly peer-pairing session to improve friendships with classmates.

The enrichment programs were held weekly during Grade 1 for 22 sessions, biweekly during Grade 2 for 14 sessions, and monthly during Grades 3–5 for 9 sessions each year. In addition, individual support was provided through home visiting (Dodge, 1993) to help parents generalize the skills presented in the group setting and to address individual needs. After Grade 1, criterion-referenced assessments were used to adjust the dosage of some components (tutoring, home visiting, and peer coaching) to match family and child need. In addition to indicated interventions, a universal intervention (the PATHS curriculum; Kusche & Greenberg, 1993) was provided to the classrooms in intervention schools through the elementary school years (Grades 1–5), to promote social and emotional competence and a more competent and less aggressive social ecology. The universal intervention included weekly teacher consultation for lessons and classroom behavior management.

Middle and early high school phase (Grades 6–10). There were three standard prevention activities offered to all Fast Track intervention children during middle school: the middle school transition program, parent and youth groups on adolescent topics, and youth forums. Adolescent developmental issues were addressed with four meetings for parents and youth during sixth grade. Parent groups focused on issues such as positive involvement and monitoring, and youth groups focused on issues such as coping with peer pressure. Parents and youth met together in groups to address romantic relationships and sex education, alcohol, tobacco and drugs, and vocational goal setting.

In Grades 7 and 8, eight Youth Forums based on Oyserman's (2000) program were held with youth in small groups to address vocational opportunities, budgeting and life skills, job interview skills, and summer employment opportunities. In Grades 7–10, individualized intervention plans were developed and implemented with each youth, based on regular assessments of risk and protective factors, conducted three times during each year. Ratings were made by project intervention staff of intervention children and their families every 4 months in four domains of functioning (parent monitoring and positive involvement; peer affiliation and peer influences; academic achievement and orientation; social cognition and identity development). Based on these ratings, youth and families either received the base level of intervention contact (once per month) or additional contact in interventions related to the targeted domain (e.g., academic tutoring, mentoring, support for positive peer-group involvement, home visiting and family problem solving, and liaisons with school and community agencies) for up to several hours more per month.

Intervention participation. Participation was defined as attendance at one or more group sessions—96% of parents and 98% of children participated during Grade 1. Of these families, 79% of parents and 90% of children attended at least 50% of all group sessions. In Grade 2, 88% of parents and 92% of children participated, with 79% of parents and 87% of children attending at least 50% of all group sessions. In Grade 3, 80% of parents and 86% of children participated, with 78% of parents and 84% of children attending at least 50% of all group sessions (for more details, see CPPRG, 2002b). The proportion of families unable to participate in the intervention increased modestly across the years, primarily due to moves out of the area. In the last year of the group sessions (Grade 6), 43 of the 445 intervention families (10%) did not participate but had still received the majority of the services in previous years.

In Grades 7 and 8, intervention became more individualized and adaptive. Participation was calculated as attendance at one or more sessions

across the seventh and eighth grades in the sets of individualized activities. Participation rates were: 63% in family meetings (M = 3.8 meetings attended, SD = 5.8), 80% in parent meetings (M = 15.5 meetings attended, SD = 16.3), 78% in individual meetings with youth (M = 23.6 meetings attended, SD = 24.5), 73% in group meetings with youth (M = 6.4 meetings attended, SD = 7.8), 64% in academically related contacts involving tutoring and homework clubs (M = 34.2 meetings attended, SD = 60.9), and 31% in youth meetings with mentors (M = 3.1 meetings attended, SD = 7.8). School or agency contacts were made on behalf of 77% of the intervention youth (M = 20.2 contacts, SD = 26.5). In terms of the content of the meetings and contacts, 78% of the youth dealt with vocational and identity development issues (M = 7.8 meetings about this, SD = 5.6), and 78% dealt with positive peer engagement issues (M = 8.1 meetings about this, SD = 5.8).

Intervention fidelity was ensured by manualization of all components, regular cross-site training and communication, weekly staff training, and ongoing clinical supervision. Outside interventions were neither encouraged nor discouraged and were assumed to occur at the same rate for intervention and control groups. The control condition was a ''treatment as usual'' comparison that included regular school prevention programs to the extent that schools chose to use them.

Outcome Measures

The Parent and Child Interview versions of the NIMH Diagnostic Interview Schedule for Children (DISC) are well-validated, highly structured, laptop computer-administered, clinical interviews to assess *Diagnostic and Statistical Manual of Mental Disorders–Fourth Edition* (*DSM–IV*) disorders in children and adolescents aged 6–18 years. We used Version 2.3 after Grade 3 (and the published anticipated *DSM–IV* criteria for diagnosis at that time) and Version IV after Grades 6, 9, and 12 (Shaffer & Fisher, 1997; Shaffer, Fisher, Lucas, & Comer, 2003; Shaffer et al., 1996). Lay interviewers, not informed about intervention status, were trained in clinical methods and scoring accuracy by Prudence Fisher of Columbia University (or someone trained directly by her) until she or the other trainer concluded that each interviewer had reached criteria. Administration took place in the child's home with the primary parent, usually the mother, during the summer following Grades 3, 6, 9, and 12. An independent administration took place during the same visit with the child following Grades 6, 9, and 12. Following recommendations, criteria were solicited for the past 6 months for oppositional defiant disorder (ODD) and ADHD, and for the past 12 months for CD. The ADHD variable omitted *DSM* criteria based on age of onset and criteria in more than one setting. The ADHD items were not solicited from the child informant. These six dichotomous (no–yes) variables were computed: (a) ODD by parent informant (ODD–P), (b) CD by parent informant (CD–P), (c) ADHD by parent informant (ADHD–P), (d) ODD by child informant (ODD–C; Grades 6, 9, 12 only), (e) CD by child informant (CD–C; Grades 6, 9, 12 only), and (f) any of the three externalizing disorders by either informant (EXT).

Statistical Model and Treatment of Missing Data

To account for sporadic missing data, 20 data sets were subjected to multiple variable imputation using PROC MI in SAS (version 9.1; SAS Institute, Cary, NC) employing a model that included all outcome variables as well as indicators for race, gender, cohort, site, 20 continuous preintervention covariates, initial severity-of-risk score, and measures reported in previous publications including academic performance, social competence, peer relations, child behavior, and parenting practices from Grades 1, 3, 4, and 5. These preintervention covariates were identified based on theoretical and empirical research on the antecedents of conduct problem behaviors. Twenty imputations should be ample given the degree of missing information in these analyses (Schafer, 1997). Given the low rate of attrition and few differences between attritted and continuing youth, the assumption that data are missing at random is plausible. Missing data rates for individual variables in the model ranged from 0% to 24%. The imputation was performed separately for the intervention, control, and normative groups to preserve interactions between intervention and other variables. Because imputation from a covariance matrix, as PROC MI uses, preserves only the estimated variances and covariances when generating imputed data sets, other effects, such as interactions between intervention status and other variables in the model, tend to be artificially weakened by the conventional imputation process. By imputing separately by intervention status, we allow the covariances among the other variables to differ by intervention, which is the definition of an interaction (Allison, 2001). The normative imputation also included the control youth to create a complete normative sample across all initial

severity-of-risk levels. We used discrete time hazard analysis to estimate the onset of disorder. Six analyses were conducted, for parent-rated CD, parent-rated ODD, parent-rated ADHD, child-rated CD, child-rated ODD, and any externalizing disorder by either rater. Discrete time hazard analysis takes into account the within-subject variable of time of measurement in a single analysis by estimating the probability of receiving a diagnosis given no previous diagnosis. The Time × Intervention interaction effect tests whether the intervention effect differs at different time points. This analysis controls for the data censoring that naturally occurs due to the fact that some subjects have not been diagnosed by Grade 12 but may be diagnosed in the future. Because we have diagnosis information in Grades 3, 6, 9, and 12 only, we employed a discrete time hazard analysis using a logistic regression model. An intent-to-treat design including all participants was used to assess intervention effects. Standard errors were clustered by kindergarten school to account for the fact that intervention was randomly assigned and implemented at the school level, as recommended by Froot (1989), Rogers (1993), Williams (2000), and Wooldridge (2002).

Table 1
Hazard Analyses of Psychiatric Diagnoses Across Time as a Function of Initial Risk Scores for Normative Sample With Standard Errors Clustered by School

	Parameter	OR	Coef.	*SE*	$p > z$
CD–P	Time	0.52	−0.66	0.26	0.01
	Risk score	2.29	0.83	0.29	0.01
	Risk Score × Time	0.81	−0.22	0.08	0.01
	Risk score squared	0.96	−0.05	0.12	0.70
	Risk Score Squared × Time	1.10	0.09	0.05	0.06
ODD–P	Time	1.03	0.03	0.13	0.84
	Risk score	2.01	0.70	0.28	0.01
	Risk Score × Time	0.87	−0.14	0.07	0.05
	Risk score squared	0.98	−0.02	0.07	0.74
	Risk Score Squared × Time	1.03	0.03	0.02	0.21
ADHD–P	Time	0.42	−0.86	0.24	0.01
	Risk score	1.42	0.35	0.18	0.05
	Risk Score × Time	0.91	−0.10	0.09	0.28
	Risk score squared	1.08	0.07	0.08	0.38
	Risk Score Squared × Time	1.00	0.00	0.05	0.96
CD–C	Time	0.68	−0.39	0.28	0.18
	Risk score	1.34	0.29	0.35	0.41
	Risk Score × Time	0.81	−0.20	0.13	0.11
	Risk score squared	0.83	−0.18	0.17	0.28
	Risk Score Squared × Time	1.10	0.09	0.08	0.22
ODD–C	Time	1.29	0.25	0.49	0.61
	Risk score	1.86	0.62	0.46	0.18
	Risk Score × Time	1.03	0.03	0.19	0.87
	Risk score squared	1.11	0.10	0.19	0.59
	Risk Score Squared × Time	0.89	−0.12	0.13	0.35
EXT	Time	0.82	−0.20	0.16	0.21
	Risk score	1.61	0.48	0.16	0.01
	Risk Score × Time	0.88	−0.13	0.06	0.03
	Risk score squared	1.10	0.09	0.10	0.33
	Risk Score Squared × Time	0.98	−0.02	0.05	0.66

Note. CD–P = conduct disorder by parent informant; ODD–P = oppositional defiant disorder by parent informant; ADHD–P = attention deficit hyperactivity disorder by parent informant; CD–C = conduct disorder by child informant; ODD–C = oppositional defiant disorder by child informant; EXT = any externalizing disorder by either informant.

Results

Prediction of Psychiatric Disorders From Early Risk

To address the first research question, we examined the relation between initial severity-of-risk score and the onset of each disorder, using the normative sample. For each outcome, the onset of the disorder was estimated as a function of time and time squared, continuous initial severity of risk (mean centered), four youth characteristics (ethnicity, gender, cohort, and site), 20 continuous baseline covariates (mean centered), and the two-way interactions between initial severity of risk and time and time squared. These two-way interactions were included to determine whether the impact of initial severity of risk on the onset of disorders changes over time. The coefficients for each of the 20 imputed data sets were combined following Rubin's (1987) rule.

Analyses are summarized in Table 1. Significant and positive main effects of the linear severity-of-risk score were found for CD–P, ODD–P, ADHD–P, and EXT. These findings indicate that the probability of the onset of psychiatric disorders among those not previously diagnosed increases as severity of risk increases. This pattern is depicted in Figure 2 for EXT, which shows that the lifetime prevalence of an externalizing disorder diagnosis increases as the initial risk score increases and becomes more likely than not (probability of .65) among the group of children in highest decile of initial risk. Among those children in the top 3% of

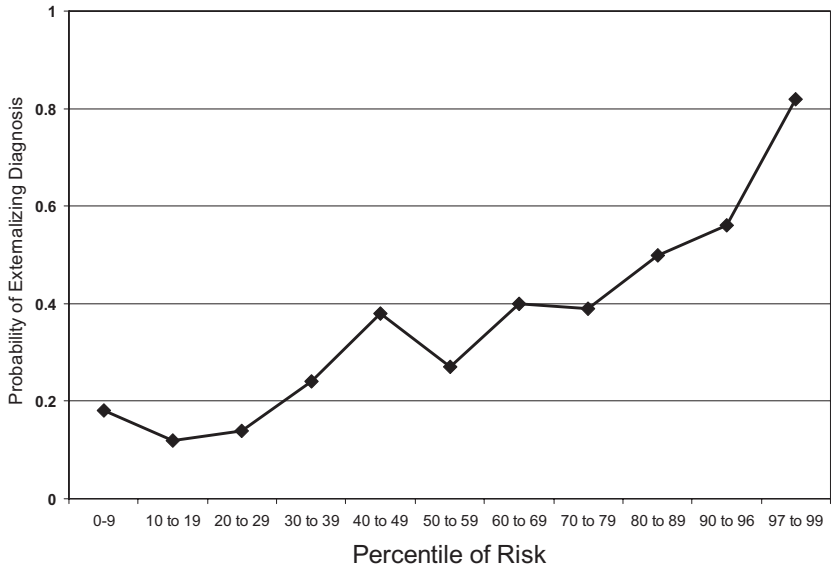

Figure 2. Relation between initial severity of risk and lifetime prevalence of any externalizing disorder.

risk scores, the probability is even higher (.82). These findings indicate that selection into a prevention program has strongest statistical power to prevent disorder among the highest decile of risk, which spans the group selected for the Fast Track program.

As shown in Table 1, significant and negative interactions between the linear severity-of-risk score and time were found for CD–P, ODD–P, and EXT. These findings indicate that the relation between initial risk score and the onset of a new diagnosis among those individuals not previously diagnosed was stronger for early years than later years, reflecting a generally declining rate of new onset in later years.

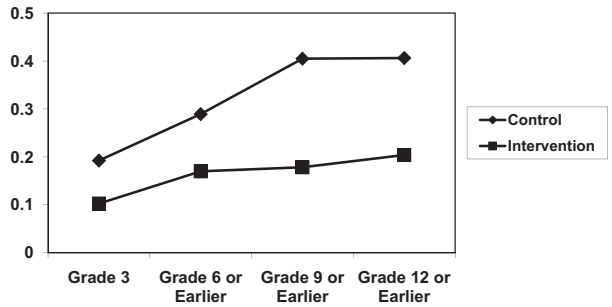

Figure 3. Cumulative rates of any externalizing diagnosis by either parent or child informant as a function of intervention among the highest risk group.

Effect of Random Assignment to Intervention on Lifetime Prevalence of Psychiatric Disorder

To address the second and third research questions, we assessed the impact of random assignment to intervention on the onset of various disorders with discrete time hazard analysis. Given the significant correlation between initial severity of risk and the onset of disorders, our model included all of the two- and three-way interactions between time, intervention, and initial severity of risk, with the three-way interaction effect entered after the other effects. The interaction between intervention and initial severity of risk assesses whether the impact of intervention varies by initial risk. The interactions between intervention and time and between initial severity-of-risk score and time indicate whether their impact varies over time. The three-way interaction examines whether the interaction effect between intervention and risk varies over time. The three-way interaction was not significant for any outcomes so the model presented here excludes the three-way interaction. Our final model also controlled for four youth characteristics (ethnicity, gender, cohort, and site) and 20 continuous baseline covariates (mean-centered). At the time of random assignment, youth were clustered within schools. To account for the fact that youth within the same school may not be independent observations, we clustered the standard errors by school. The coefficients for each of the 20 imputed data sets were combined following Rubin's (1987) rule.

Table 2
Hazard Analysis Results With Clustered Standard Errors: Impact of Time, Severity of Risk, Intervention, and Their Interactions on the Onset of Psychiatric Disorders

	Outcome variable					
Model effect	CD–P	ODD–P	ADHD–P	CD–C	ODD–C	EXT
Time	−.54 (.08)**	−.31 (.07)**	−1.03 (.09)**	−.26 (.13)*	−.37 (.17)*	−.54 (.06)**
Initial risk	.28 (.18)	.10 (.17)	−.01 (.15)	.07 (.28)	−.06 (.28)	.11 (.13)
Intervention	.35 (.21)	.07 (.14)	.08 (.16)	.39 (.27)	.22 (.27)	.12 (.13)
Risk × Time	−.08 (.08)	.00 (.07)	.06 (.08)	.04 (.14)	.16 (.15)	−.01 (.07)
Intervention × Time	−.09 (.08)	−.02 (.06)	−.03 (.09)	−.22 (.15)	−.16 (.15)	−.05 (.06)
Intervention × Risk	−.22 (.08)**	−.13 (.08)†	−.16 (.08)*	.01 (.12)	−.05 (.11)	−.14 (.06)*

Note. The three-way interaction effect was never significant and is excluded from the model. CD–P = conduct disorder by parent informant; ODD–P = oppositional defiant disorder by parent informant; ADHD–P = attention deficit hyperactivity disorder by parent informant; CD–C = conduct disorder by child informant; ODD–C = oppositional defiant disorder by child informant; EXT = any externalizing disorder by either informant.
$^{\dagger}p < .09$. *$p < .05$. **$p < .01$.

The second research question concerns the impact of random assignment to intervention on the onset of externalizing psychiatric disorders through the end of Grade 12, 2 years after intervention ceased. Table 2 provides the hazard analysis results. No significant main effects of intervention were found, but the interaction effect between intervention and severity of initial risk was significant for CD–P, ODD–P (marginal), ADHD–P, and EXT. To interpret these effects, intervention and control group means were computed and contrasted within each of two levels of severity of initial risk (most severe 3% of the normative population [called *highest risk*], and lower than the highest 3% [called *moderate risk*]). The 3% cutoff accounts for 16% of the entire sample of intervention and control children. It was selected because a previous report (CPPRG, 2007) found that this cutoff identified the group that was most responsive to intervention. Lifetime rates of disorders by risk group are listed in Table 3. In addition, we estimated separate hazard analysis models for these two samples. The model included time, time squared, intervention, the two-way interactions between time and intervention status, four youth characteristics (ethnicity, gender, cohort, and site), and 20 continuous baseline covariates (mean-centered). The standard errors for both models were clustered by school.

Within the highest risk group, significant effects of intervention were found for CD–P, ODD–P, ADHD–P (marginal), and CD–C (marginal). For all variables, the pattern was similar: Random assignment to intervention was associated with lower rates of disorder than assignment to control. The magnitude of effect was sizeable: For example, for CD–P, among the highest risk group, the lifetime prevalence as a result of assignment to intervention was reduced by half, from 41% to 20%. The proportion of highest risk children who were free from any externalizing diagnosis by any informant was raised by assignment to intervention from 18% to 32%. Within the moderate-risk group, one of six analyses was significant: For onset of parent-rated CD, the control group had a lower rate than the intervention group.

Table 3
Lifetime Prevalence of Psychiatric Disorders by Intervention Condition and Severity of Initial Risk Level

	Group			
	Highest risk		Moderate risk	
Variable	Intervention $N = 70$	Control $N = 72$	Intervention $N = 375$	Control $N = 374$
CD–P	.204	.406*	.202	.130*
ODD–P	.370	.560*	.313	.296
ADHD–P	.463	.642†	.408	.372
CD–C	.204	.327†	.150	.132
ODD–C	.097	.192	.098	.097
EXT	.682	.823	.594	.558

Note. The three-way interaction effect was never significant and is excluded from the model. CD–P = conduct disorder by parent informant; ODD–P = oppositional defiant disorder by parent informant; ADHD–P = attention deficit hyperactivity disorder by parent informant; CD–C = conduct disorder by child informant; ODD–C = oppositional defiant disorder by child informant; EXT = any externalizing disorder by either informant.
*Cell contrast that is significant at $p < .05$, based on a hazard analysis with clustered standard errors described in the text.
†Cell contrast that is significant at $p < .09$, based on a hazard analysis with clustered standard errors described in the text.

Table 4
Cumulative Rates of Lifetime Psychiatric Diagnoses as a Function of Assignment to Intervention Among Highest Risk Group Only

Variable	Group	Grade level			
		3	6	9	12
Conduct disorder–parent informant	Control	.19	.29	.40	.41
	Intervention	.10	.17	.18	.20
Oppositional defiant disorder–parent informant	Control	.30	.40	.52	.56
	Intervention	.13	.26	.33	.37
Attention deficit hyperactivity disorder–parent informant	Control	.45	.54	.61	.64
	Intervention	.34	.40	.45	.46
Conduct disorder–child informant	Control	—	.12	.24	.33
	Intervention	—	.11	.14	.20
Oppositional defiant disorder–child informant	Control	—	.07	.13	.19
	Intervention	—	.05	.07	.10
Any externalizing disorder by either informant	Control	.54	.67	.78	.82
	Intervention	.38	.55	.61	.68

Effect of Random Assignment to Intervention on Psychiatric Disorder Across Years

The third research question concerning the timing of intervention effects was addressed by testing whether the magnitude of intervention effects varied by year. Within the discrete time hazard analysis framework, a significant interaction effect between intervention and time, or among Intervention × Risk × Time, would indicate different intervention effect sizes across years. No effects of the interaction between intervention and time were significant. No three-way interaction effects among intervention, risk, and time were significant, indicating that the Intervention × Risk effects described earlier held across each succeeding year. That is, we can conclude that among the highest risk group of children, new positive effects of intervention held each year, for the variables CD–P, ODD–P, ADHD–P, and EXT. These patterns are shown in Table 4, which lists the cumulative lifetime rates of psychiatric diagnoses for the highest risk group of children by intervention versus control conditions at each year. As shown there, in general the difference between intervention and control groups grew larger each year, although the difference in Grade 12 is not appreciably larger than that in Grade 9 because very few new cases occur during this last span of time.

Discussion

This study contributes three important findings to the developmental and prevention science literatures and in so doing contributes to the raising of healthy children. First, a multiple-gating screening procedure employed in kindergarten was found to predict lifetime externalizing disorder by age 18, with the highest risk group demonstrating an 82% probability of ultimate diagnosis. Second, random assignment to the 10-year-long Fast Track intervention was found to prevent externalizing psychiatric disorder over 12 years, including the 2-year period after intervention ended, among the highest risk group. Third, the Fast Track intervention was shown to yield cumulating effects on disorder across the multiple years of implementation.

Contribution to Understanding the Risk–Psychiatric Disorder Curve

Identifying highest risk children early is crucial for selection into prevention programs to economize on scarce prevention resources. The current findings indicate that a highest risk group can be identified through a multiple-gating procedure that involves screening all kindergarten children through a brief teacher rating instrument, followed by screening the top 40% with parent reports. The combined risk score identifies a highest risk group at the top 3 percentile that grows up to have an 82% lifetime prevalence of an externalizing psychiatric disorder, compared with just 32% for the entire population. This group is also substantially higher in risk than the group just below it between the 90th and 97th percentiles (58% prevalence) and the group between the 80th and 90th percentiles (50% prevalence).

Identifying individuals early in life who grow up to become chronically antisocial is important because it is a way to minimize the cost of preventive intervention programs by targeting a program to a limited number. Although measures of early antisocial behavior statistically predict later outcomes, they typically yield many false positive predictions that are costly for prevention programs. The current study employed a two-stage screening method that combined teacher and parent ratings efficiently and yielded a group that proved to have relatively few (only 18%) false negative predictions for later externalizing psychiatric disorder.

Contribution to Prevention of CD

The current study is the first to demonstrate that long-term intervention can prevent psychiatrically diagnosed CD in the group of highest risk children, with positive effects continuing for at least 2 years after intervention ceases. A prior study (CPPRG,

2007) had found the same pattern of effects through ninth grade, but this study demonstrates that the effect remains for at least 2 years after intervention ends. Without intervention, only 18% of this group remains free from any externalizing psychiatric disorder by age 18. With random assignment to intervention, this rate rises to 32%. This preventive effect is inconsistent with the hypothesis that intervention with this highest risk group merely scaffolds their adjustment while intervention remains in place. It is also inconsistent with the hypothesis that a rebound effect would ensue following termination of intervention.

This finding challenges publicized myths (e.g., Dilulio, 1995; Herrnstein & Murray, 1994) about this group being inherently flawed as ''superpredators'' and destined to lives of disorder and crime. It provides experimental evidence that is consistent with the developmental cascade model that posits the role of environmental factors in catalyzing antisocial development in early-starting children. The findings encourage those like Sherman (2007) who advocate bringing more resources to the highest risk group of youth. It may also encourage parents and clinicians who work with these children to reduce antisocial behavior.

Although the positive effects were sustained for 2 years after intervention ended, there was little evidence that the effect grew or weakened after intervention ended. This pattern is consistent with the cumulative dose model and would seem to refute the scaffolding model in Figure 1. That is, the magnitude of difference between the intervention and control groups was similar after Grade 9 and Grade 12. In general, few cases of disorder were identified in either group for the first time during high school, a finding that is consistent with theories of these disorders as generally early starting. To the extent that new cases are not initiated after age 15, perhaps preventive intervention does not need to continue past this age.

The findings also indicate that intervention did not have a positive effect among the group of children called ''moderate risk,'' that is, between the 80th and 97th percentiles of risk. The lack of positive effects and one negative effect on parent-reported CD were surprising, given previously published findings of favorable impact on parenting, peer relations, and academic and social-cognitive skills in this group during the first 3 years of intervention (CPPRG, 2002b). However, the rate of psychiatric disorders among this moderate-risk group is not substantially higher than the rate among the normative population; thus, it is not clear that intervention to prevent psychiatric disorders would be warranted with this group. Boxer, Guerra, Huesmann, and Morales (2005) found that their group intervention had positive impact on the more aggressive participants and adverse impact on the less aggressive participants, a pattern that has some similarities to the current pattern. Follow-up is necessary to determine whether this group bears risk for other maladjustment outcomes in adulthood.

Contribution to Understanding the Timing and Course of Intervention Effects

The hazard analyses conducted in this study indicate that new positive effects of intervention with the highest risk group occurred at each time point of measurement while intervention was ongoing, in a series of tests that is similar to three new experiments across time. That is, after the first 3 years of intervention, those children who had been randomly assigned to intervention were less likely to be diagnosed with CD, ODD, and ADHD than were control children. The next test discards those children who had already been diagnosed and examines those children who had not been diagnosed by third grade. Among this group, assignment to intervention had a positive effect on these diagnoses by sixth grade, and among those children who had not been diagnosed by sixth grade, intervention had a positive effect on diagnoses by ninth grade.

These findings buttress the rationale for long-term intervention with early-starting children. That is, as intervention continued, new positive effects of intervention were found. When intervention ceased, the positive effects were sustained but did not grow any larger. It must be noted that the current study did not employ the experimental manipulation that is necessary to test the rationale for sustained intervention rigorously. Such a test would involve randomly assigning children to varying lengths of intervention. It is plausible that positive effects of intervention would grow across adolescent development even under conditions of only 3 years of intervention in early elementary school. On the other hand, no other long-term follow-up studies of short-term intervention have yet yielded such growing effects. Future studies might examine these hypotheses experimentally.

Limitations

The major limit of this study is that the design afforded only two conditions, intervention and

control. The dynamic cascade model and various intervention effects hypotheses require additional conditions to distinguish effects. Specifically, interventions of varying time periods would enable one to discern whether early intervention effects would be sustained without continued intervention. Also, interventions that include only partial components (e.g., parenting but not peer relations enhancement or vice versa) would enable one to discern whether positive intervention effects of a partial intervention would cascade into broader impact.

Another limit is that participants have been followed for only 2 years after intervention ended. Although the 10-year intervention brought children past the period of almost all natural onset of CD, it remains plausible that intervention effects on the highest risk group will dissipate or rebound as they become adults. Follow-up is needed.

Just as important is the need to follow up with the moderate-risk youth. This group responded favorably to intervention in early elementary school, but impact on them receded as they entered adolescence. Whether they will regain any positive effects of intervention when they enter adulthood is not clear.

Raising Healthy Children: Implications for Policy and Practice

This study contributes to the raising of healthy children by demonstrating that systematic intervention across a long period can have sustained impact on the highest risk children. This group is typically ostracized by school policies, but this study refutes the notion that they are incorrigible. The Fast Track program is but one approach to intervention with this high-risk group, and the findings give hope to numerous approaches by demonstrating that ''life-course persistence'' of CD may actually be malleable. The implications are vast. Judicial policies over the past two decades (Griffin, 2003) have stiffened sentences for juvenile offenders based on the presumption that this group cannot benefit from intervention, but the current study refutes that presumption and should be used in judicial challenges to unnecessarily long sentencing. Education policies have emphasized segregation of this group through suspensions, expulsions, and alternative schools (Dodge, Lansford, & Dishion, 2006), but the current study demonstrates an effective means of keeping these children in mainstream classrooms. Furthermore, given the positive findings, intervention with the highest risk group stands a reasonable chance of having a secondary positive effect on the rest of the school population, through reduction of deviant peer influences and improvement of classroom behavior. Funding policies increasingly require empirical evidence as the basis for funding decisions, and this study provides that evidence. Finally, the American public's framing of violent youths as ''superpredators'' (Dodge, 2008) can be challenged by a growing body of studies that demonstrate positive outcomes of intervention with these youths.

Gladwell (2006) and Sherman (2007) referred to the group of chronically antisocial adults as the ''power few,'' meaning the small percentage of offenders who cost society the greatest amount of harm and financial resources. This concept is the negative side of Kock's (1999) argument that just 20% of a population is responsible for 80% of the population's products; in the current context, Gladwell and Sherman argue that a small percentage of a population account for a high proportion of the costs to society. Sherman argued that public policies should direct most resources to this small group that causes greatest harm, and that intervention experiments should focus on this group because they yield the greatest statistical power to detect effects and yield cost–beneficial impact. Gladwell argued that concentration of resources on this highest risk group might be economically sensible, but he found the notion morally problematic and concluded, ''Power-curve problems leave us with an unpleasant choice. We can be true to our principles or we can fix the problem. We cannot do both'' (Gladwell, 2006, p. 104). Sherman argued that no moral principles would be compromised if scientific scrutiny and preventive resources were focused on the power few.

The current study provides an empirically supported multiple-gating screening method that identifies a highest risk group in kindergarten (just 3% of the population) that grows up to have a highly likely probability (.82) of externalizing disorder. Whether this highest risk group is the ''power few'' that accounts for an inordinate amount of costs to society is not certain, although we speculate that they likely do cost a great deal because they are the life-persistent group of antisocial individuals who get placed in special education, adjudicated in juvenile court, imprisoned as young adults, and are chronically unemployed (Dodge, Coie, et al., 2006). The good news is that an intensive, long-term, developmental science-based intervention such as Fast Track is effective with this highest risk group in preventing onset of CD. In fact, the risk is reduced by about half.

The implication of this study is that we now have the assessment technology to identify a group of children in kindergarten who seem headed for costly CD in later childhood, and we have the intervention technology to interrupt that development. Whether society chooses to mount the massive effort to employ these tools is not at all clear. The costs would be enormous, although the benefits would likely be even greater. Perhaps the most immediate implication of this research is that this highest risk group is not inevitably destined to become ''superpredators'' because we now know how to deflect their developmental course.

References

Achenbach, T. M. (1991a). *Manual for the Child Behavior Checklist and revised Child Behavior Profile*. Burlington: Department of Psychiatry, University of Vermont.

Achenbach, T. M. (1991b). *Manual for the Teacher's Report Form*. Burlington: Department of Psychiatry, University of Vermont.

Allison, P. D. (2001). *Missing data* (University Papers Series on Quantitative Applications in the Social Sciences, series no. 07-136). Thousand Oaks, CA: Sage.

Bierman, K., & Conduct Problems Prevention Research Group. (1996). Social skills training in the Fast Track Program. In R. Dev. Peters & R. J. McMahon (Eds.), *Preventing childhood disorders, substance use, and delinquency* (pp. 65–89). Thousand Oaks, CA: Sage.

Boxer, P., Guerra, N. G., Huesmann, L. R., & Morales, J. (2005). Proximal peer-level effects of a small-group selected prevention on aggression in elementary school children: An investigation of the peer contagion hypothesis. *Journal of Abnormal Child Psychology*, *33*, 325–328.

Cohen, M. A. (2005). *The costs of crime and justice*. New York: Routledge.

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

Conduct Problems Prevention Research Group. (1999a). Initial impact of the Fast Track Prevention Trial for Conduct Problems: I. The high-risk sample. *Journal of Consulting and Clinical Psychology*, *67*, 631–647.

Conduct Problems Prevention Research Group. (1999b). Initial impact of the Fast Track Prevention Trial for Conduct Problems: II. Classroom effects. *Journal of Consulting and Clinical Psychology*, *67*, 648–657.

Conduct Problems Prevention Research Group. (2002a). Evaluation of the first three years of the Fast Track Prevention Trial with children at high risk for adolescent conduct problems. *Journal of Abnormal Child Psychology*, *30*, 19–35.

Conduct Problems Prevention Research Group. (2002b). Predictor and moderator variables associated with positive Fast Track outcomes at the end of third grade. *Journal of Abnormal Child Psychology*, *30*, 37–52.

Conduct Problems Prevention Research Group. (2004). The effects of the Fast Track Program on serious problem outcomes at the end of elementary school. *Journal of Clinical Child and Adolescent Psychology*, *33*, 650–661.

Conduct Problems Prevention Research Group. (2007). The Fast Track randomized controlled trial to prevent externalizing psychiatric disorders: Findings from Grades 3 to 9. *Journal of the American Academy of Child and Adolescent Psychiatry*, *46*, 1250–1262.

Conduct Problems Prevention Research Group. (2010). The difficulty of maintaining positive intervention effects: A look at disruptive behavior, deviant peer relations, and social skills during the middle school years. *Journal of Early Adolescence*, *6*, 131–157.

Dilulio, J. J. (1995). The coming of the super-predators. *The Weekly Standard*, *1*(11), 23–30.

Dishion, T. J., Patterson, G. R., & Griesler, P. C. (1994). Peer adaptation in the development of antisocial behavior: A confluence model. In L. R. Huesmann (Ed.), *Aggressive behavior: Current perspectives* (pp. 61–95). New York: Plenum.

Dodge, K. A. (1993). *Home visiting manual for the Fast Track program*. Unpublished manuscript, Nashville, TN.

Dodge, K. A. (2008). Framing public policy and prevention of chronic violence in American youth. *American Psychologist*, *63*, 573–590.

Dodge, K. A., Bates, J. E., & Pettit, G. S. (1990). Mechanisms in the cycle of violence. *Science*, *250*, 1678–1683.

Dodge, K. A., Coie, J. D., & Lynam, D. (2006). Aggression and antisocial behavior in youth. In W. Damon (Series Ed.) & N. Eisenberg (Vol. Ed.), *Handbook of child psychology: Vol. 3. Social, emotional, and personality development* (6th ed., pp. 719–788). New York: Wiley.

Dodge, K. A., Greenberg, M. T., Malone, P. S., & The Conduct Problems Prevention Research Group. (2008). Testing an idealized dynamic cascade model of the development of serious violence in adolescence. *Child Development*, *79*, 1907–1927.

Dodge, K. A., Lansford, J. E., Burks, V. S., Bates, J. E., Pettit, G. S., Fontaine, R., et al. (2003). Peer rejection and social information-processing factors in the development of aggressive behavior problems in children. *Child Development*, *74*, 374–393.

Dodge, K. A., Lansford, J. E., & Dishion, T. J. (Eds.). (2006). The problem of deviant peer influences in intervention programs. In *Deviant peer influences in programs for youth: Problems and solutions* (pp. 3–13). New York: Guilford.

Dodge, K. A., Malone, P. S., Lansford, J. E., Miller-Johnson, S., Pettit, G. S., & Bates, J. E. (2006). Toward a dynamic developmental model of the role of parents and peers in early onset substance use. In A. Clarke-Stewart & J. Dunn (Eds.), *Families count: Effects on child and adolescent development* (pp. 104–134). New York: Cambridge University Press.

Foster, E. M., Jones, D. E., & the Conduct Problems Prevention Research Group. (2006). Can a costly intervention be cost-effective? An analysis of violence prevention. *Archives of General Psychiatry*, *63*, 1284–1291.

Froot, K. A. (1989). Consistent covariance matrix estimation with cross-sectional dependence and heteroskedasticity in financial data. *Journal of Financial and Quantitative Analysis*, *24*, 333–355.

Gladwell, M. (2006). Million dollar Murray: Why problems like homelessness may be easier to solve than to manage. *The New Yorker*, February 13.

Griffin, P. (2003). *Trying and sentencing juveniles as adults: An analysis of state transfer and blended sentencing laws*. Pittsburgh, PA: National Center for Juvenile Justice.

Herrnstein, R. J., & Murray, C. (1994). *The bell curve*. New York: Free Press.

Hollingshead, A. B. (1975). *Four factor index of social status*. New Haven, CT: Yale University.

Kock, R. (1999). *The 80/20 principle: The secret to success by achieving more with less*. New York: Doubleday.

Kusche, C. A., & Greenberg, M. T. (1993). *The PATHS (Promoting Alternative Thinking Strategies) curriculum*. Deerfield, MA: Channing-Bete.

Ladd, G. W. (2003). Probing the adaptive significance of children's behavior and relationships in the school context: A child by environment perspective. *Advances in Child Development and Behavior*, *31*, 43–104.

Lochman, J. E., & The Conduct Problems Prevention Research Group. (1995). Screening of child behavior problems for prevention programs at school entry. *Journal of Consulting and Clinical Psychology*, *63*, 549–559.

Lochman, J. E., & Wells, K. C. (2004). The Coping Power program for preadolescent aggressive boys and their parents: Outcome effects at the one-year follow-up. *Journal of Consulting and Clinical Psychology*, *72*, 571–578.

McMahon, R. J., & Slough, N., & the Conduct Problems Prevention Research Group (K. A. Dodge, member). (1996). Family-based intervention in the Fast Track Program. In R. Dev. Peters & R. J. McMahon (Eds.), *Preventing childhood disorders, substance use, and delinquency* (pp. 90–110). Thousand Oaks, CA: Sage.

Moffitt, T. E. (1993). Adolescence-limited and life-course-persistent antisocial behavior: A development taxonomy. *Psychological Review*, *100*, 674–701.

Oyserman, D. (2000). *School-to-jobs facilitators manual after-school program*. Ann Arbor: University of Michigan.

Perry, C. L., Lee, S., Stigler, M. H., Farbakhsh, K., Komro, K. A., Gewirtz, A. H., et al. (2007). The impact of Project Northland on selected MMPI-A problem behavior scales. *Journal of Primary Prevention*, *28*, 449–465.

Perry, C. L., Williams, C. L., Komro, K. A., Veblen-Mortenson, S., Stigler, M. H., Munson, K. A., et al. (2002). Project Northland: Long-term outcomes of community action to reduce adolescent alcohol use. *Health Education Research*, *17*, 117–132.

Perry, C. L., Williams, C. L., Veblen-Mortenson, S., Toomey, T. L., Komro, K. A., Anstine, P. S., et al. (1996). Project Northland: Outcomes of a communitywide alcohol use prevention program during early adolescence. *American Journal of Public Health*, *86*, 956–965.

Quay, H. C., & Peterson, D. R. (1987). *Manual for the Revised Behavior Problem Checklist*. Coral Gables, FL: University of Miami.

Reinherz, H. Z., Tanner, J. L., Berger, S. R., Beardslee, W. R., & Fitzmaurice, G. M. (2006). Adolescent suicidal ideation as predictive of psychopathology, suicidal behavior and compromised functioning at age 30. *American Journal of Psychiatry*, *163*, 1226–1232.

Rogers, W. H. (1993). Regression standard errors in clustered samples. *Stata Technical Bulletin*, *13*, 19–23 [Reprinted in *Stata Technical Bulletin Reprints*, *3*, 88–94].

Rubin, D. B. (1987). *Multiple imputation for nonresponse in surveys*. New York: Wiley.

Schafer, J. L. (1997). *Analysis of incomplete multivariate data*. London: Chapman and Hall.

Shaffer, D., & Fisher, P. (1997). *NIMH—Diagnostic interview schedule for children: Parent informant*. New York: New York State Psychiatric Institute.

Shaffer, D., Fisher, P., Dulcan, M. K., Davies, M., Piacentini, J., Schwab-Stone, M. E., et al. (1996). The NIMH Diagnostic Interview Schedule for Children, version 2.3 (DISC-2.3): Description, acceptability, prevalence rates, and performance in the MECA study. *Journal of the American Academy of Child and Adolescent Psychiatry*, *35*, 865–877.

Shaffer, D., Fisher, P., Lucas, C., & Comer, J. (2003). *Scoring manual: Diagnostic interview schedule for children (DISC-IV)*. New York: Columbia University.

Sherman, L. J. (2007). The power few: Experimental criminology and the reduction of harm. *Journal of Experimental Criminology*, *3*, 299–321.

Stormshak, E. A., Bierman, K. L., McMahon, R. J., Lengua, L., & the Conduct Problems Prevention Research Group. (2000). Parenting practices and child disruptive behavior problems in early elementary school. *Journal of Clinical Child Psychology*, *29*, 17–29.

Vitaro, F., Brendgen, M., Pagani., L., Tremblay, R. E., & McDuff, P. (1999). Disruptive behavior, peer association, and conduct disorder: Testing the developmental links through early intervention. *Development and Psychopathology*, *11*, 287–304.

Webster-Stratton, C., Reid, M. J., & Stoolmiller, M. (2008). Preventing conduct problems and improving school readiness: Evaluation of the Incredible Years Teacher and Child Training Programs in high-risk schools. *Journal of Child Psychology and Psychiatry*, *49*, 471–488.

Werthamer-Larsson, L., Kellam, S. G., & Wheeler, L. (1991). Effects of first grade classroom environment on shy behavior, aggressive behavior, and concentration problems. *American Journal of Community Psychology*, *19*, 585–602.

Williams, R. L. (2000). A note on robust variance estimation for cluster-correlated data. *Biometrics*, *56*, 645–646.

Wooldridge, J. M. (2002). *Econometric analysis of cross section and panel data*. Cambridge, MA: MIT Press.