

## A Bimodal Preventive Intervention for Disruptive Kindergarten Boys: Its Impact Through Mid-Adolescence

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Disruptive kindergarten boys from inner-city low socioeconomic neighborhood schools were randomly allocated to a preventive intervention and control condition. The 2-year prevention program included a home-based parent training component and a school-based social skills training component. Participants were followed up to mid-adolescence. Results indicated that a significantly greater percentage of treated boys remained in an age-appropriate regular classroom up to the end of elementary school and that the treated boys reported significantly less delinquent behaviors at yearly assessments from 10 to 15 years old, compared with controls. The preventive intervention appeared to have a significant long-term impact on the social development of the disruptive kindergarten boys. Earlier and more intensive intervention may be necessary for some cases, whereas for all disruptive boys, booster sessions between 12 and 15 years of age are recommended.

It has been well established that an entrenched, disruptive behavioral pattern during the early school years markedly increases the risk for later antisocial behavior (e.g., Ensminger, Kellam, & Rubin, 1983; Farrington, 1991; Huesmann, Eron, Lefkowitz, & Walder, 1984; McCord, 1991; Robins, 1966; Stattin & Magnusson, 1989; Tremblay et al., 1992; Tremblay, Pihl, Vitaro, & Dobkin, 1994; White, Moffitt, Earls, Robins, & Silva, 1990). Hence, a consistently deviant antisocial pathway across development becomes apparent (Moffitt, 1993; Patterson, DeBaryshe & Ramsey, 1989).

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This study was funded by the National Welfare Grants Program of the Canadian Ministry of Health and Welfare, the Conseil québécois de la Recherche Sociale, Fonds FCAR (Formation de Chercheurs et l'Aide à la Recherche); Social Sciences and Humanities Research Council of Canada, the Conseil de la Santé et des Services Sociaux Régional du Montréal Métropolitain, the Fondation Cité des Prairies, and the Centre d'Accueil le Mainbourg.

Lucie Bertrand coordinated the intervention program. Rita Béland, Michel Bouillon, Raymond Labelle, Hélène O'Reilly, and Danièle Reclus-Prince implemented the intervention. Lucille David and Hélène Beauchesne coordinated the data collection. Lyse Desmarais-Gervais, Hélène Boileau, Maria Rosa, and Muriel Rorive created the data bank and assisted with the statistical analyses. Minh T. Trinh provided the documentation.

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The search for "the cause" of antisocial behavior has often resulted in an etiological debate regarding the influence of individual versus parent factors (e.g., Dodge, 1990; Lytton, 1990; McCord, 1993; Rowe, 1993). Some studies suggest that ineffective parenting may lead to antisocial disorders (Loeber & Stouthamer-Loeber, 1986), whereas others indicate that genetic and perinatal factors influence the risk of criminality (e.g., Duyme, 1989; Mednick, Gabrielli, & Hutchings, 1987; Plomin, Nitz, & Rowe, 1990). However, parental characteristics before the birth of a child remain strong predictors of both child-rearing practices and behavioral dispositions in children (Huesmann et al., 1984; Frick et al., 1992; Lahey et al., 1988; Serbin, Peters, McAffer, & Schwartzman, 1991), supporting the bidirectional nature of adult-child relationships in the parenting process (Belsky, 1984; Shaw & Bell, 1993). The conclusions drawn from these developmental studies have important implications for the nature, timing, and focus of intervention programs (e.g., Dodge, 1993; Kazdin, 1993; Reid, 1993).

In the past several decades, a multitude of parent effectiveness and social skills training programs have been developed, based on the assumption that either parental practices or children's social skills determine the course of disruptive disorders. Although such training programs appear promising, the preponderance of evidence suggests that single-focus programs achieve a low level of efficacy (Dumas, 1989; Kazdin, 1987, 1993). It is now generally proposed that interventions aiming to change the course of disruptive behavior must focus on modifying the different sources of influence that affect the development of antisocial behavior (Coie & Jacobs, 1993; Dodge, 1993; Reid, 1993). From this perspective, parent-focused and child-focused programs would be considered essential components of any multimodal approach (Dodge, 1993; Kazdin, 1993; Reid, 1993).

The timing of preventive interventions with youths at high

risk for antisocial behavior remains an important issue. Because antisocial behavior problems are most salient during adolescence, this period has traditionally been the focus of most efforts. Numerous experimental interventions have also been implemented with prepubertal disruptive children, because it is at this period that troublesome behavior begins to appear as less manageable by adults (Coie & Jacobs, 1993). However, Eron (1990; Eron, Huesmann, & Zelli, 1991) has suggested that aggressive behavior crystallizes at approximately 8 years of age. It logically follows that interventions aiming to reduce antisocial outcomes should focus on at-risk children before this developmental period.

In light of current developmental theories of antisocial behavior, one would expect that a parent-and-child-focused intervention, administered at a theoretically crucial point in development with an adequate level of intensity and duration should alter not only the short-term but the long-term developmental trajectory of young disruptive boys as well (Dodge, 1993). However, long-term effects of treatment are not easily discernible. Kazdin (1993) has underscored the fact that the majority of child treatment studies have not collected follow-up data and that even a follow-up assessment as short as 1 year has been infrequent. Clearly, studies without extended follow-up preclude the assessment of the impact of interventions directed at modifying the developmental course of antisocial behavior. When interventions are conceptualized from a developmental perspective, one can easily imagine that effects that cannot be seen at the end of treatment (because they were not or could not be assessed) could be transformed into developmentally meaningful effects over the long term. Such delayed effects can be positive, as shown by the Perry Preschool Program (Schweinhart, Barnes, & Weikart, 1993), but they can also be negative, as shown by the Cambridge-Somerville study (McCord, 1978, 1992). Thus, the repeated longitudinal assessment of the impact of an intervention on children's lives remains essential from a scientific, clinical, and ethical perspective.

The nesting of experimental interventions within longitudinal studies is one way of ensuring the rigorous assessment of long-term effects of treatments while remaining cost efficient (Farrington, Ohlin, & Wilson, 1986; Tonry et al., 1991). The Montréal Longitudinal-Experimental Study represents such a design. Its general aim was to prospectively examine the development of a large sample of inner-city kindergarten boys, with a particular focus on antisocial behavior. From this sample, a subgroup of boys identified as disruptive in kindergarten was selected to test the effects of a preventive intervention program. Previous studies have noted beneficial effects during the elementary school years. (McCord, Tremblay, Vitaro, & Desmarais-Gervais, 1994; Tremblay et al., 1992; Vitaro & Tremblay, 1994). This article investigates the impact of the intervention on school adjustment and the development of delinquent behavior to age 15 (i.e., 6 years after the completion of the 2-year bimodal intervention program), a time when boys are most at risk for delinquent behavior (Farrington, 1986).

## Method

### Participants

Kindergarten teachers from schools in lower socioeconomic areas of Montréal, Québec, Canada were asked to rate the behavior of their male

Table 1  
*Participant Selection Process During Treatment and Follow-Up*

Variable	<i>n</i> from treatment group	<i>n</i> from observation group	<i>n</i> from control group	Total
Randomized assignment	96	152	71	319
Ineligible participants	21	28	11	60
Eligible (net)	75	124	60	259
Participants who refused	32	42	19	93
Participants (net)	43	82	41	166

students at the end of the 1984 school year. Ratings were obtained from 87% of the teachers, for a total of 1,161 boys from 53 schools.

Of the total sample, the boys with a disruptive score above the 70th percentile ( $n = 366$ ) on the Social Behavior Questionnaire (SBQ; Tremblay et al., 1991) were considered to be at risk for later antisocial behavior (Tremblay et al., 1992; White et al., 1990), 319 of which were randomly allocated to one of three groups (i.e., treatment, attention-control, or control; see Tremblay et al., 1992, for further elaboration regarding the characteristics of each group). A telephone interview with each mother permitted the verification of whether the family met two important criteria for eligibility: (a) ethnicity (only boys with Canadian-born parents whose first language was French were included) and (b) education (only boys whose parents had 14 years or less of schooling were included). Boys were excluded from the study if the family did not meet these criteria. In total, 904 boys met these selection criteria, 259 of which had been rated above the 70th percentile on the disruptive score (see Table 1). Of these, 16 were excluded from the analyses because they could not be located or they refused to answer the pertinent questions.<sup>1</sup>

The first of the three at-risk groups experienced the treatment condition for experimental study of the preventive intervention. The attention-control group represents the sensitization-contact condition. These boys participated in an intensive (school-based, home-based, and laboratory-based) observational study (Charlebois, LeBlanc, Gagnon, Larivée, & Tremblay, 1995; Lavigne, Tremblay, & Saucier, 1995). Every second year (ages 7, 9, 11 or ages 8, 10, 12), the families were visited during four evenings. Families also came to the university laboratory for a 3-hr session on a Saturday. In addition, the child was observed at school for half a day on four occasions and spent a whole day in the university laboratory during the summer. Each family was assigned a resource person who made frequent contacts to plan the observation sessions and to collect questionnaire and interview data. Over the years, the mothers established trusting relationships with their resource persons. When the families asked for help they were referred to local mental health service professionals. A third group of boys from the at-risk population was created to act as a control group for assessing effects of the prevention experiment and also for evaluating the effect of the intensive observation condition. To ensure equivalence with the other two groups, each of which required consent, parents of children assigned to the control group were asked if they would participate in the activities required for the observational group if the research team was able to include them.

The three groups of disruptive boys were compared with a popula-

<sup>1</sup> In Tremblay et al. (1991b), 249 participants were reported to have met the criteria for inclusion. Recent verification of the demographic information obtained from the families revealed that six of these participants had one parent (five fathers and one mother) with more than 14 years of schooling. These participants were not included in the analyses reported here.

tion-based random sample of kindergarten boys from French public schools in the province of Québec, Canada in 1986-1987 ( $N = 1,000$ ). Families participating in this study were found to be significantly more socioeconomically disadvantaged than the representative sample of their same sex peers, as the occupational socioeconomic status (SES) and level of education of both parents were consistently lower (Table 2). Moreover, they were consistently younger at the birth of their son, and the total family income was lower. The average family income was between \$20,000 and \$25,000 (Canadian dollars) for families of the disruptive boys compared with \$30,000 and \$35,000 (Canadian dollars) for families from the population-based random sample,  $t(681) = -6.18, p < .001$ .

### Treatment Procedure

On reviewing the literature addressing early intervention with aggressive children before 1984, two foci of treatment were selected: (a) parent training in effective child rearing and (b) social skills for the children (Bertrand, 1988). Both components were implemented by a multidisciplinary team, consisting of two university trained child-care workers, one psychologist, and one social worker. Working full time and being supervised by a half-time project coordinator, each case worker was responsible for providing individualized home-based training sessions to parents of 12 families and school-based group social skills sessions for 12 boys from 12 other families. This arrangement created a team approach, where two professionals coordinated their efforts with one family (i.e., one with the parents at home, the other with the child at school).

The parent-training component was based on the Oregon Social Learning Center Model (Patterson, 1982; Patterson, Reid, Jones, & Conger, 1975). The training procedures included giving parents a reading program, teaching parents to monitor their children's behavior and to give children positive reinforcement for prosocial behavior, training parents to discipline effectively without using abusive punishment, teaching parents family crisis management techniques, and encouraging parents to transfer their new knowledge to new situations. The professionals followed this sequence and used as many sessions needed for the parents to master the skills (Bertrand, 1988). The maximum number of sessions given to families was 46, with the mean number of sessions for the duration of the program being 17.4, including parents that refused to continue participation. Teachers were contacted periodically to discuss the child's progress, the parents' involvement, and other issues the teacher would find pertinent.

For the disruptive boys receiving the intervention, it was reasoned that training in social skills would change their behavior toward peers, lead to more social acceptance, making them less inclined to turn to more antisocial activities. Two types of social skills training were administered by the professionals during lunch time within the context of a small group of four to seven prosocial peers from school, with the ratio being three prosocial peers for each disruptive boy. Prosocial peers were nominated by teachers. A prosocial skills training curriculum was implemented in the first year, consisting of nine sessions based on previous work (e.g., Cartledge & Milburn, 1980; Michelson, Sugai, Wood, & Kazdin, 1983). In the second year, 10 sessions were given to enhance children's problem solving and self-control in conflict situations, on the basis of previous work (Camp, Blom, Hebert, & Van Doorninck, 1977; Goldstein, Sprafkin, Gershaw, & Klein, 1980; Kettlewell & Kausch, 1983; Meichenbaum, 1977). The duration of the intervention program was 2 school years, from September 1985 to June 1987. Boys were 7 years old when the treatment was initiated and 9 years old when it ended.

### Measures

**School adjustment.** It was expected that if disruptive behaviors were reduced, academic adjustment would likely show improvement. Being placed out of a regular classroom appropriate for their age served as an indicator of severe school maladjustment (Tremblay et al., 1991). No significant group differences had been observed for performance in mathematics and French when the boys were in first grade, the year before the intervention started.

**Teacher ratings of disruptive behavior.** We obtained these ratings from 10- to 15-year-old boys using the SBQ (Tremblay et al., 1991), which had been used to select the disruptive boys in kindergarten (age 6). From age 10 to age 12, the boys were in elementary school and had one main teacher for the whole day. From age 13 to 15, most boys had more than one teacher every day. Math and French teachers were used as raters because they had the most contact with the boys. The mean internal consistency alpha for that scale between ages 6 and 15 years was .91 (range, .89 to .93). Scores ranged from 0 to 26 (13 items scored 0, 1, or 2).

**Self-reported juvenile delinquency.** The boys completed a self-report questionnaire addressing their involvement in antisocial behavior from ages 10 to 15 (a) Eleven questions were asked about theft (kept objects worth \$10 or more, stole something from a store, stole \$100 or more, entered without paying admission, stole money from home, stole some-

Table 2  
Demographic Characteristics for the Kindergarten Disruptive Sample  
and a Random Sample of Kindergarten Boys From Across Québec

Demographic characteristic for each parent	<i>M</i> (and <i>SD</i> ) disruptive ( $n = 165$ )	<i>M</i> (and <i>SD</i> ) random sample ( $n = 1,000$ )	<i>t</i>
Occupational SES <sup>a</sup>			
Mother	34.99 (11.05)	45.80 (13.10)	-10.04*
Father	35.76 (9.68)	44.41 (15.00)	-9.06*
Level of education			
Mother	10.01 (2.15)	11.91 (2.63)	-10.10*
Father	9.71 (2.38)	12.10 (3.40)	-10.72*
Age at birth of target son			
Mother	24.08 (4.10)	26.87 (4.46)	-7.94*
Father	27.00 (5.21)	29.31 (4.75)	-4.79*

Note. SES = socioeconomic status.

<sup>a</sup> Based on the Blishen and McRoberts (1976) socioeconomic index for Canada.

\*  $p < .001$ .

thing worth \$10, stole something worth between \$10 and \$100, stole a bicycle, bought a stolen article, broke down a door to take something, been in an unauthorized place), (b) three questions about alcohol and drug use (consumed alcohol, has been drunk, consumed marijuana), and (c) six questions about vandalism (destroyed instruments, intentionally destroyed other's property, intentionally broke parts of school property, purposely broke something belonging to a family member, intentionally destroyed part of an automobile, set fire). At age 10, the boys were asked to report if they had ever misbehaved in the specified ways. From age 11, they were asked whether they had engaged in such behaviors in the previous 12 months. The response format for each question was never, once or twice, often, very often (scored 1, 2, 3, and 4) providing a range of total scores between 20 and 80. The mean internal consistency alpha between 11 and 15 years of age is .91 (range, .87 to .93).

**Juvenile court records.** Juvenile court files were used to identify boys who had been placed under the Juvenile Offenders' Act between ages 12 to 15 (this Canadian law does not apply before age 12). Youths are placed under this act if they are arrested by the police, charged, and found guilty of having broken a Canadian law. As such, they are officially designated as "delinquents." From the entire sample of 901 boys that met the criteria, 30 boys were placed under the Juvenile Offenders' Act. Between ages 10 and 15, these boys reported more delinquent acts than those who were not placed under that law,  $t(1, N = 875) = 2.67, p = .01$ . Interestingly, 6.7% of the disruptive kindergarten boys were placed under the Juvenile Offenders' Act between ages 12 and 15, compared with 1.7% for the nondisruptive kindergarten boys,  $\chi^2(1, N = 901) = 15.82, p < .001$ .

**Perceptions of parenting behavior.** Boys' perceptions of their parents' child-rearing practices were annually assessed from ages 10 to 15, with questions specifically probing parental supervision and punishment during the previous 12 months. Supervision describes to what extent the parents monitored their son's activities. The variable is composed of two questions: (a) Do your parents know about your whereabouts when you go out? and (b) Do your parents know with whom you are spending time when you go out? The boy answered by choosing "never," "sometimes," "often," or "always." The greater the score on supervision, the more the child is supervised. Cronbach's alpha for the supervision score has a mean of .74 between ages 10 and 15. The two questions that assessed the variable of parental supervision were accidentally omitted at age 13. The punishment variable represents the total of the following five questions: (a) Do your parents punish you by slapping or hitting you? (b) Do your parents punish you by not letting you do things you would like to do? (c) Do your parents punish you by arguing? (d) Do your parents punish you by saying that you cause them distress? and (e) Do your parents punish you by calling you names? The choices range from "never," "sometimes," "often," and "always." The greater the score on punishment, the more the boy is punished. Cronbach's alpha for the punishment score has a mean of .62.

### Data Analyses

To understand the effects of the treatment from a developmental perspective, a repeated measures approach was used to analyze the data. Two different procedures were used depending on the nature of the data. The SAS PROC CATMOD procedure, which treats categorical data, was used to examine school adjustment (i.e., class placement). The BMDP 5V procedure was used to analyze teacher-rated disruptiveness, self-reported delinquency, and perceived parenting. This program allows for missing values. Of the original 166 participants (43 treated, 41 control, 82 attention-control), 99% were included in the teacher-rated disruptiveness analysis, 96% in the self-reported delinquency analysis, 99% (supervision) and 96% (punishment) in the perceived parenting analysis. Only one participant could not be included in the analysis be-

cause of missing data; this participant (from the attention-control group) died at age 10.

### Results

Because no significant between-group differences were observed between the control and attention-control group on any of the measures of interest, these two conditions were combined to form a comparison group for the analyses that follow.

#### School Adjustment

The percentage of treated and untreated boys who were in an age-appropriate regular classroom from ages 10 to 15 is presented in Figure 1. The percentages for the total original sample of 901 participants are shown as well. At age 10, 1 year after the end of treatment, the boys should have been in a regular Grade 4. At age 12 the boys should have been in their last year of elementary school, and at age 15 they should have been in their third year of high school. It can be seen from Figure 1 that a larger proportion of the treated boys, compared with the untreated were in an age-appropriate regular classroom during the elementary school years (ages 10 to 12), but that this difference disappeared from age 13 onward (i.e., during the high school years). The proportion of boys in an age-appropriate regular classroom declined steadily from age 10 to age 15 when the total sample of boys (disruptive and nondisruptive) was considered. At age 15, only 40.7% of the boys were in a regular third year of high school.

To test the effects of the treatment on school adjustment, we computed a repeated log-linear analysis with SAS using the PROC CATMOD procedure. Only 3 years were selected for this comparative analysis because this statistical procedure depends on asymptotic approximations and requires an effective sample of approximately 25 for each response function that is analyzed (where the number of response functions corresponds to the number of repeated measures minus one; SAS Institute, 1989, p. 205). Ages 10, 12 and 15 years were selected for the analysis because they represented the beginning (age 10) and the end (age 15) of the follow-up, as well as the year before the expected transition to high school.

The results of the repeated loglinear analysis detected no overall group differences,  $\chi^2(1, N = 164) = 3.08, p > .05$ , in the

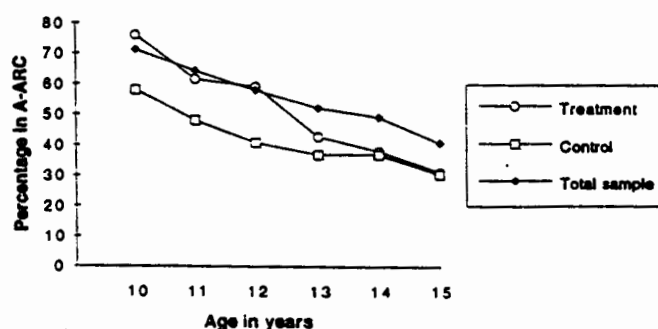


Figure 1. The percentage of treatment group and control group boys who were in an age-appropriate regular classroom (A-ARC) from age 10 to age 15.

patterns of class status; however, a significant difference in the pattern of class status was found over time,  $\chi^2(2, N = 164) = 71.11, p < .05$ , as well as a Time  $\times$  Group effect,  $\chi^2(2, N = 164) = 5.99, p = .05$ , indicating that the patterns differed significantly between the groups and that class status varied over time. These results reflected the fact that more participants from the treatment group remained in an age-appropriate regular class up to age 12 and that this difference disappeared from age 13 onward.

### Teacher-Rated Disruptiveness

To test the effect of the treatment on the developmental trend of disruptive behavior, we used an unbalanced repeated measures model with an unstructured covariance matrix. The 5V procedure in BMDP was used to analyze teacher-rated disruptiveness. An unstructured model was chosen because the repeated measures did not satisfy the univariate criterion of circularity and sphericity. The resulting unstructured analysis is actually the incomplete data analog of a multivariate analysis of repeated measures. For this procedure, the level of teacher-rated disruptiveness from age 10 to 15 was compared between the groups. The level of disruptiveness was adjusted using the boys' kindergarten disruptiveness score on the SBQ. For this analysis, the covariate was judged to be adequately reliable for covariance analysis.

As shown in Figure 2, the results revealed an overall significant difference in the level of teacher-rated disruptiveness over time,  $G^2(5, N = 164) = 49.30, p < .05$ , confirming a decrease in the level of disruptiveness over time. However, the between-group difference in teacher-rated disruptiveness,  $G^2(5, N = 164) = 2.60, p > .05$ , was not found to be significantly different, nor was the between-group teacher-rated Disruptiveness  $\times$  Time interaction,  $G^2(5, N = 164) = 3.44, p > .05$ . Although no significant main effect was found, a trend toward between-group differences for teacher-rated disruptiveness was evident; that is, the participants in the treatment group tended to be evaluated by the teachers as less disruptive than the comparison group from age 10 to age 13. It can be observed in Figure 2 that the level of disruptiveness of the total sample also decreased with age.

### Self-Reported Delinquency

The longitudinal effects of the treatment on boys' self-reported delinquency were analyzed using an unbalanced re-

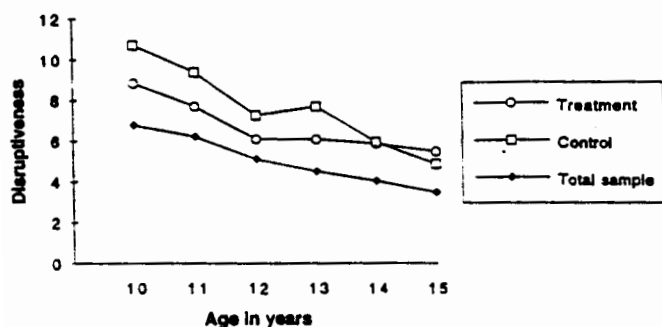


Figure 2. The level of teacher-rated disruptiveness from age 10 to age 15.

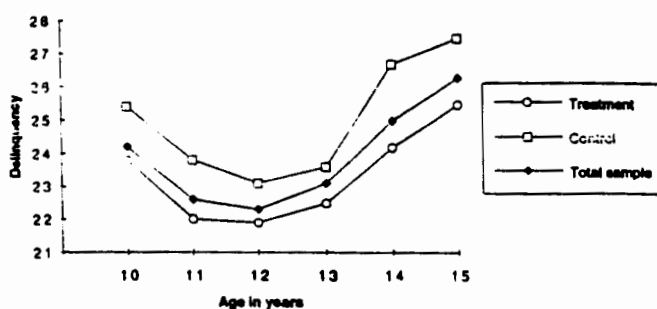


Figure 3. The self-reported delinquency patterns for the three groups of disruptive boys (as well as the pattern for the total sample).

peated measures model with an unstructured covariance matrix. Again, the 5V procedure in BMDP was used. The long-term effects of the treatment on the boys' overall delinquency scales were compared from age 10 to age 15. In this analysis, boys' delinquency scores were adjusted by their level of disruptiveness in 1984 (age 6). The covariate was not found to be significant and, consequently, it was removed from the analysis.

The self-reported delinquency patterns for the three groups of disruptive boys (as well as the pattern for the total sample) are shown in Figure 3. The curvilinear effect is partly due to the fact that the questions at age 10 requested a report of delinquent behavior up to age 10, whereas older boys were asked to report delinquent behavior in the past 12 months. The statistical analysis indicated that the boys' delinquency level significantly changed over time,  $G^2(5, N = 159) = 45.84, p < .05$ . This effect was somewhat expected, as the delinquency level was more likely to increase over time. There was no Group  $\times$  Time interaction,  $G^2(5, N = 159) = 0.92, p > .05$ , however there was a significant between-group difference,  $G^2(1, N = 159) = 4.18, p < .05$ , indicating that the treated group was reporting significantly less delinquent behaviors 1 to 6 years after the end of the intervention. No significant differences were observed between the treated and untreated groups when the total self-reported delinquency score was broken down into the stealing, vandalism, and drug use subscales.

### Juvenile Court Records

The juvenile court records provided an opportunity to verify official sanctions of extreme delinquent behavior. A total of 30 boys (3.3% of the total sample of 901 boys) were found to have been placed under the young offenders' act between ages 12 and 15. Of the disruptive boys who received treatment, 9.3% ( $n = 4$ ) were placed under the Juvenile Offenders' Act, in contrast to 7.4% ( $n = 9$ ) for the disruptive comparison group. This difference was not found to be significant,  $\chi^2(1, N = 165) = .162, p > .05$ .

### Parenting

Because the intervention included a parent-training component, it was expected that a successful treatment would have changed parental behavior to the extent that the boys would

perceive this change. Figure 4 shows that boys perceived they were being punished less and less as they became older,  $G^2(4, N = 159) = 38.65, p < .05$ . Surprisingly, there were no significant differences between the treated and untreated groups,  $G^2(1, N = 159) = 0.11, p > .05$ . The evolution of boys' perceptions of parental supervision are shown in Figure 5. Between ages 13 and 15, the treated boys tended to perceive more supervision from their parents than the untreated boys. Here too, the statistical analyses did not reveal any significant between-group differences.

### Discussion

The purpose of this article was to report the impact of a bimodal preventive intervention on the subsequent development of boys that exhibited a disruptive behavioral pattern in kindergarten. These boys were considered at high risk for later antisocial behavior. Development was examined by comparing treated boys with an appropriate control condition on a number of outcomes at prepubertal age, pubertal age, and again at mid-adolescence. The development of the treated and untreated disruptive kindergarten boys was presented against the backdrop consisting of the total original sample of disadvantaged urban boys. Such comparisons revealed that the disruptive kindergarten boys were indeed more at risk for antisocial behavior than their nondisruptive peers (see also Dobkin, Tremblay, Mâsse, & Vitaro, in press; Pulkkinen & Tremblay, 1992). The parent-and-child-oriented intervention administered between 7 and 9 years old appeared to have a different beneficial influence on the boys' development, depending on age, domain, and data source.

With respect to global school adjustment, measured by being in an age-appropriate regular classroom, the intervention appeared to have a positive impact during the elementary school years; however, that impact disappeared by age 15, when the boys should have been in their third year of high school. This result is somewhat disappointing. It was intuitively expected that success in elementary school would have a positive effect on success in secondary school. However, when consideration is given to the level of success for the whole sample of boys who were in the low-SES kindergarten classes, it can be seen that a majority (59.3%) were not in an age-appropriate regular classroom by age 15. Given that poor school adjustment appears to be the norm for this sample of boys from low-SES environments, it becomes improbable that an intervention directed at

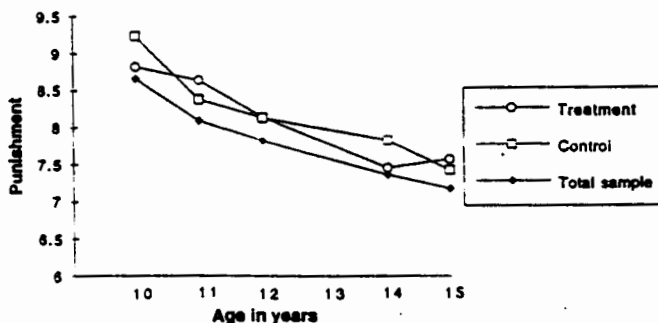


Figure 4. Boys' perceptions of punishment by parents.

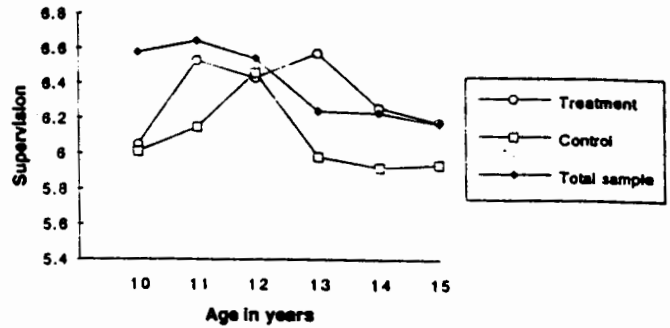


Figure 5. Boys' perception of supervision by parents.

disruptive behavior would have enabled disruptive kindergarten boys to have more success in high school than the majority of their peers. It is important to note that this phenomenon could not have been observed if the experiment had not been nested within a longitudinal study of a population-based age cohort.

The importance of the beneficial impact on elementary school adjustment should not be overlooked. The boys who remained in an age-appropriate regular classroom during elementary school were in a very different social and intellectual environment, compared with those who were held back or placed in special classes or schools. The quality of that environment may have had beneficial effects on other aspects of their development during high school (e.g., self-esteem, delinquency; Coie & Jacobs, 1993). Because being placed out of an age-appropriate regular classroom in high school appears to be normative for this cohort of boys, it is reasonable to speculate that being out of an age-appropriate classroom may not have the negative psychosocial impact that it could have if it happened during the elementary school years.

Similar results were obtained for teacher-rated disruptiveness, although in this case, the differences did not reach statistical significance. It is important to comment on this trend, because it suggests a different story from the previous results. The differences between the treated and untreated groups were observed during elementary school and disappeared during high school, as did the difference in global school adjustment. However, in this case the disruptive boys appeared to become better adjusted (i.e., teachers progressively giving lower disruptive ratings). Either most of the boys were becoming decreasingly disruptive or high school teachers were less able to observe these behaviors. Whatever the reason, it becomes less likely with time that adolescent boys will be evaluated as highly disruptive by their teachers. Hence, teacher-rated disruptive behavior in high school may not be an adequate indicator for the outcome of some preventive interventions.

Delinquency was assessed both with self-reports and court records. The latter did not reveal any significant differences between the groups. It was hoped that an intensive early intervention with disruptive boys would have reduced the number of boys who were put under the Juvenile Offenders' Act. Clearly, such a procedure is costly both in terms of social resources and human suffering for the boys and their families. It can also be seen that it is not a negligible phenomenon; 1.7% of the kindergarten boys from the low-SES schools and

6.7% of the disruptive kindergarten boys from that cohort were placed under the Young Offenders' Act between ages 12 and 15. However, because of the small number of treated participants, the power to detect a significant impact of the treatment on this variable was very low.

Thus, from the perspective of official delinquency, it is not clear to what extent this type of intervention with these at-risk boys has achieved its aim. However, from the perspective of self-reported delinquency the intervention has reduced the number of delinquent behaviors from age 10 to age 15. Taken together, these results could be an indication that the intervention did not have an impact on the worst cases (i.e., those with official juvenile delinquency records) but had an impact by significantly reducing the frequency of delinquent behaviors for a group of high-risk boys. This could be a meaningful effect, because each delinquent behavior is a socially meaningful event for a number of individuals (e.g., the victim, the delinquent, the families involved, the social control agents). It may be a meaningful effect for the development of the disruptive kindergarten boys as well, if reducing the frequency of their delinquent behavior from age 10 to age 15 has an impact on key developmental issues such as how they perceive themselves and who they associate with when they enter the period of young adulthood. This should be the focus of future assessments. The fact that the difference between the treated and untreated groups was maintained up to age 15 is especially encouraging, because one could have expected that the difference would disappear when delinquent behavior becomes more widespread in mid-adolescence (Farrington, 1986).

The findings suggest that the comparative changes in delinquent behavior and the significantly higher levels of academic adjustment observed in youngsters from the experimental group may be attributable to the treatment. Improving parental practices and children's social competence does appear to influence their risk outcomes over the long term, supporting the hypotheses that parent effectiveness and social skills training are related to delinquent behavior. However, data from the boys' perceptions of parental supervision and punishment do not support the hypothesis that the parent training intervention had a significant impact on those particular child-rearing behaviors. Because boys' reports of parental supervision and punishment have been linked to self-reported delinquency (Hirschi, 1969), it was expected that boys' perceptions of their parents' child-rearing practices could be shown as mediators of the differences in self-reported delinquency. These counterintuitive results show how difficult it is to find clear causal paths in the development of deviant human behavior. The absence of a control group that received only parent training or only social skills training precludes more elaborate theoretical conclusions regarding which component of the bimodal intervention contributed the most variance in the boys' behavioral development. Nevertheless, there is sufficient literature suggesting the low level of efficacy when each component is used as the sole ingredient of treatment (Dumas, 1989; Kazdin, 1987, 1993). One can speculate that parent training could have indirect effects on boys' adjustment. The training could change some behaviors of the parents (e.g., more parent initiated contacts with teachers)

without changing their discipline and monitoring behaviors to the point of significantly influencing the child's perception.

It would be surprising to find that a single intervention during elementary school, albeit multimodal and intensive, would change the developmental trajectories of disruptive boys and their families to the extent that they would never be in need of further support. The impact of such early interventions could possibly be increased by booster sessions with the boys and their parents before delinquency peaks in midadolescence. Ideally, a 2-year booster program could be implemented during the last year of elementary school (preparing for the transition to high school) and then during junior high school (immediately after the transition). In terms of content, booster treatments could involve enhancing problem-solving skills, life skills, and study skills to improve the participants' communication, conflict resolution, self-control, and academic abilities when faced with the less structured academic setting of high school and increased peer pressure. It would be equally important to offer a booster program for parents. This would be most needed during the junior high year, when parents must improve their monitoring and communication skills with their young adolescent, who is striving for more autonomy.

A number of limitations must be kept in mind. First the study was limited to French-speaking disruptive kindergarten boys living in low socioeconomic areas of a large metropolitan city in Canada. Disruptiveness was defined to include the 30% most disruptive boys in a population of disadvantaged urban boys. Although these boys were clearly more at risk for later delinquent behavior than those below the cutoff point, risk varied within this group. The relatively small number of treated participants precluded an analysis of treatment effects according to the risk level in kindergarten.

Understanding the impact of the intervention is also limited by the fact that no dose-response analyses could be performed. The professionals were instructed to give as many parent training sessions as needed by the families within the 2-year period. As such, families with the worst prognoses received more treatment. This is sound practice from a clinical and ethical perspective, but it obviates the study of dose response. A larger number of participants would be needed to study dose response and level of initial risk.

One can argue that these results may not be clinically meaningful. Nevertheless, the present study shows that an intensive intervention with disruptive kindergarten boys can have statistically significant positive results over the long term. The results also suggest that this impact varies with time. We believe that only larger studies with repeated booster sessions could show a clear impact on serious juvenile delinquency and adult crime. It may well be that this aim can be achieved only by intensive interventions with at-risk children before they enter kindergarten. This would mean more investment in prevention during pregnancy and infancy, as well as a firm commitment to follow these participants into adolescence and adulthood.

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Received February 5, 1994

Revision received December 14, 1994

Accepted December 14, 1994 ■