THE RELATIONSHIP BETWEEN LEARNING DISABILITIES AND JUVENILE DELINQUENCY: EXECUTIVE SUMMARY

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BRIEF SUMMARY OF RESEARCH FINDINGS

Abstract

This report summarizes the results of a research project designed to investigate the relationship between learning disabilities (LD) and juvenile delinquency and to evaluate the effectiveness of academic remediation in improving the educational achievement and reducing the delinquency of learning-disabled delinquents. A cross-sectional study of 1,943 adolescent males sampled from public schools, juvenile courts and corrections facilities found that learning disabilities and delinquency were significantly related. This relationship remained significant even when differences between learning-disabled and non-learning-disabled youths in sociodemographic backgrounds and tendencies to give socially approved responses were statistically controlled. The boys with LD reported significantly higher rates of general delinquent behavior. Their tendencies to engage in violence, substance abuse, and school disruption were especially greater than those of the non-learning-disabled boys. The likelihood of arrest and adjudication was also substantially higher for the teenagers handicapped by learning disabilities. Somewhat surprisingly, this was true even when the probabilities of arrest and adjudication for similar offenses were compared. A longitudinal investigation of 351 officially nondelinquent boys assessed the development of delinquency over a two-year period. The results of this research were generally consistent with those from the cross-sectional study. The learning-disabled adolescents evidenced greater increases over time in self-reported and official delinquency than their non-learning-disabled counterparts. The evaluation of an academic treatment program demonstrated that remedial instruction was effective in improving the academic skills and decreasing both the self-reported and official delinquency of learning-disabled youths who had been officially adjudicated. The degree of effectiveness, however, depended upon the amount of remediation received and upon certain intellectual and social characteristics of the participants. Implications for public policy and future research are discussed.

THE RELATIONSHIP BETWEEN LEARNING DISABILITIES

AND JUVENILE DELINQUENCY:

SUMMARY AND IMPLICATIONS OF RESEARCH FINDINGS

Background

This report summarizes the results of a research project initiated in 1976 by the National Institute for Juvenile Justice and Delinquency Prevention (NIJJDP), Office of Juvenile Justice and Delinquency Prevention, U.S. Department of Justice, to investigate the relationship between learning disabilities (LD) and juvenile delinquency. Learning disabilities are defined as impairments of perceptual, thinking, and communicative processes which are manifested by a significant discrepancy between a child's expected achievement (based on intelligence test scores) and his or her actual achievement. During the late 1960s and early 1970s many parents and professionals in education and juvenile justice became concerned that the incidence of delinquency appeared to be much higher for learning-disabled youths than for their non-learning-disabled peers. In response to this growing concern NIJJDP commissioned Charles Murray of the American Institutes for Research to review the empirical evidence relevant to the proposition that specific learning disabilities increase the risk of becoming delinquent.

Murray, after evaluating the quantitative evidence gathered through 1975 for a link between learning disabilities and juvenile delinquency, concluded that previous research was so deficient that it could not be used "even for rough estimates of the strength of the link" (p. 65). Furthermore, he argued that "the existence of a causal relationship between learning disabilities and delinquency [had not been] established" and that "the evidence for a causal link [was] feeble" (Murray, 1976, p. 65). His report recommended that carefully controlled investigations of the effects of LD on delinquency be undertaken and that a demonstration remediation program be implemented to assess the efficacy of diagnosing and treating delinquents with learning disabilities. Similar conclusions and recommendations were reached in a study by the General Accounting Office.

In response to these recommendations, NIJJDP funded a research and demonstration project to provide empirical data upon which informed policy decisions could be made. One grant was awarded to the Association for Children with Learning Disabilities (ACLD) to design and conduct a remediation program to improve the academic skills and reduce the delinquency of learning-disabled teenagers who had been officially adjudicated as delinquents by a juvenile court. The National Center for State Courts (NCSC) received a second grant to undertake large-scale studies of the relationship between LD and delinquency and to carry out an extensive evaluation of the effectiveness of the ACLD remediation program. In order to obtain as much information as possible about the causal effects of LD, both age-cross-sectional and longitudinal studies of the relationship between learning disabilities and delinquency were conducted by NCSC.

Possible Reasons for a Relationship Between LD and Delinquency

A number of possible reasons, or hypotheses, have been advanced to explain why there could be a relationship between learning disabilities and delinquency. The school failure hypothesis maintains that learning disabilities produce academic failure which, in turn, results in delinquent behavior. Stated differently, LD indirectly increases delinquent behavior because of its negative impact on school performance according to this hypothesis. Several explanations have been offered for the fact that poor academic achievement may contribute to delinquency. First, the negative self-image and sense of frustration resulting from failure in school could motivate the learning-disabled student to strike back at society in anger and retaliation. This kind of psychological reaction, which is frequently referred to as frustration/aggression, could make the learning-disabled delinquent especially violence prone. Second, as a result of school failure, learning-disabled children might be labeled as problem students and grouped with other children who have behavior problems. Such negative labeling and association with delinquency-prone children could prompt learning-disabled youths to engage subsequently in socially troublesome behavior. Third, failure in school may decrease the child's attachment, or bond, to school as an institution and to teachers as significant adults. The failure-induced withdrawal of attachment and commitment to socially accepted courses of action may be intensified by the active rejection or uncaring attitude of school teachers and administrators. Social control theory predicts that delinquency would increase among students with LD as their attachment and commitment to school diminished. Fourth, learning-disabled teenagers may experience economic incentives to commit crimes, especially theft, if they anticipate that their poor academic record will make it impossible for them to achieve their aspired levels of occupational prestige or income. Fifth, by causing the child to be unsuccessful at school, learning disabilities could foster the general tendency to attribute blame for negative events to others instead of to oneself. Some research has suggested that youthful offenders tend to make external rather than internal attributions of responsibility for their actions. Any one or combination of these five causal processes could underlie the hypothesized indirect effect of LD on delinquent behavior through school failure.

According to the susceptibility hypothesis, children with learning disabilities possess certain cognitive and personality characteristics which make them more susceptible to opportunities for engaging in delinquent activities. Such characteristics include lack of impulse control, inability to anticipate the future consequences of actions, poor perception of social cues, irritability, suggestibility, and the tendency to act out. Proponents of this view argue that these traits, which are frequently associated with LD, contribute directly to the development of delinquent behavior.

The susceptibility and school failure hypotheses contend that LD (together with other factors) directly or indirectly determines delinquent behavior. Assuming that the probability of arrest is a function of the frequency and seriousness of delinquent acts, the susceptibility and school failure hypotheses would predict a

proportionate increase in the probability of arrest for learning-disabled youths. The differential arrest hypothesis, however, maintains that even for comparable levels of delinquent activity, learning-disabled adolescents have a greater risk of being picked up by the police than do their non-learning-disabled contemporaries. Two causal processes have been proposed as possible explanations for this phenomenon. Learning-disabled youths may be more likely than non-learning-disabled to be detected for the same offenses, since they lack the abilities necessary to plan strategies to avoid being detected, to dissemble during encounters with police (i.e., to conceal their true intentions, feelings, or activities), or to comprehend the questions and warnings of law enforcement officers. Secondly, the police may pick up, interrogate, and arrest learning-disabled adolescents disproportionately, because of the tendency of learning-disabled teenagers to be awkward and abrasive in social interactions. Previous research has demonstrated that demeanor is an extremely important factor in determining whether an arrest will be made in routine encounters with the police. It should be noted that it is possible for the differential arrest hypothesis to be true even if actual delinquent behavior is not increased by learning disabilities.

Adopting a similar rationale, some have suggested that learning-disabled youths have a higher probability of adjudication following arrest than do their non-learning-disabled cohorts who have committed the same offense. The differential adjudication hypothesis holds that learning-disabled teenagers who have been charged with a violation are at greater risk of adjudication than similarly charged non-learning-disabled adolescents. This could result from two different causal processes. First, it may be that learning-disabled youths are treated differently than their non-learning-disabled counterparts by juvenile justice officials, because of the characteristics associated with learning disabilities, such as social abrasiveness, irritability, and lack of self-control. Different treatment could be received from any of several officials, e.g., intake or probation officers, defense or prosecuting attorneys, or judges. Second, learning-disabled youths may be at greater risk of adjudication than their non-learning-disabled peers, because they lack certain cognitive and social skills. For example, youths with LD may be unable to understand the legal proceedings, to communicate effectively their perception of events (to tell "their side of the story"), and to dissimulate or play what has been called the "strategy game" of juvenile justice proceedings. As was noted with respect to the differential arrest hypothesis, it is possible for the differential adjudication hypothesis to be true regardless of whether learning-disabled youth actually commit relatively more delinquent acts.

It has been hypothesized also that, learning-disabled adolescents have a greater risk of being committed to a training school or other youth correctional facility than non-learning-disabled teenagers who have been adjudicated on the same charge(s). For the same reasons outlined above for differential adjudication, the differential disposition hypothesis contends that learning-disabled youths have a higher probability of receiving a severe disposition from the juvenile court.

Two hypotheses have been advanced which maintain that learning disabilities do not have a causal effect on delinquency, that is, any observed relationship is spurious. According to the sociodemographic

characteristics hypothesis, both LD and delinquency are caused by sociodemographic factors, such as parent education and ethnicity. Thus, according to this view, differences in delinquency between learning-disabled and non-learning-disabled juveniles should be attributed to the sociodemographic differences between them, rather than to the cognitive and social characteristics associated with LD.

The response bias hypothesis proposes that actual differences in antisocial behavior do not exist between learning-disabled and non-learning-disabled adolescents. Rather, learning-disabled teenagers do not conceal as much of their antisocial behavior as do their non-learning-disabled peers when being interviewed. This difference in the tendency to dissemble produces a spurious relationship between LD and delinquency. Thus, according to this explanation, non-learning-disabled children commit just as many delinquent acts as learning-disabled ones, but they more frequently fake the socially desirable response during interviews. It is the lack of this response style among youths with LD that produces the incorrect impression that learning-disabled adolescents are more delinquent. It should be understood that these two spuriousness hypotheses are not necessarily mutually exclusive with the preceding five hypotheses, which postulate causal relationships between LD and delinquent behavior or official delinquency. For example, an empirical relationship between learning disabilities and delinquency may be due, in part, to causal factors and, in part, to spurious factors.

In this section we have considered seven hypotheses that have been advanced as possible explanations for a relationship between LD and delinquency. Although most of these hypotheses had been proposed before the initiation of this research, some have grown out of it. Very little systematic research, other than that carried out by the National Center for State Courts, has evaluated any of these hypotheses. Moreover, evaluating the hypotheses poses a complex research problem. For example, finding support for one of the hypotheses does not reduce the credibility of any of the others since they are not mutually exclusive. To test effectively any one of the hypotheses requires a data set which permits testing of the complete set of hypotheses. Such large data sets are very difficult and expensive to obtain. This explains why so few studies of the association between LD and delinquency have furnished information about the specific reasons for any relationship that was observed. Fortunately, the data gathered by NCSC allowed at least a partial test of each of the hypotheses to be made.

Studies of the Relationship Between LD and Delinquency

Two investigations were conducted to determine whether a relationship exists between learning disabilities and delinquency, and, if so, to examine the nature of that relationship. Both an age-cross-sectional study (based on a sample containing a cross-section of age groups measured at a single point in time) and a longitudinal investigation (in which a sample was studied over time with measurements made at regular intervals) were undertaken in order to make the findings as informative as possible. In this section we describe first the cross-sectional study and then the longitudinal investigation. Implications for public policy and future research are presented last.

Cross-sectional Study

Participants in the age-cross-sectional study were boys sampled from public schools, juvenile courts, training schools, and departments of corrections in the metropolitan areas of Baltimore, Indianapolis, and Phoenix during 1977 and 1978. The sample included 973 teenagers from the public schools who had not been adjudicated previously according to juvenile court records and 970 youths who had been officially adjudicated delinquent by one of the juvenile courts. At the time of data collection, 329, or 34%, of the adjudicated delinquents were confined to youth correctional institutions. The remaining delinquents were on probation or parole or in aftercare supervision. The average age of the boys was 15 years. They came from varied ethnic backgrounds: 50% were white; 35% were black; 6% were Hispanic; and 7% were members of other ethnic groups.

Information from school records, standardized test scores, and behavioral observations was used to assess learning disabilities. Boys were classified as non-learning-disabled either if their records did not indicate the presence of learning problems or if any learning problems that were found could be attributed to mental retardation, severe emotional disturbance, physical handicap, or to the fact that their primary language was not English. The remainder of the sample was administered a battery of tests by the Educational Testing Service (ETS) under contract to the National Center for State Courts, from which learning disabilities could be diagnosed. The tests included the Wechsler Intelligence Scale for Children--Revised, the Woodcock Reading Mastery Tests, the KeyMath Diagnostic Arithmetic Test, and the Visual Motor Gestalt Test. In addition, the tester rated the child's behavior during testing for hyperactivity, inattentiveness, and other signs of learning disabilities.

LD classifications were made on the basis of significant discrepancies among ability and achievement test scores and the presence of perceptual and behavioral problems. In general, a two-year difference between ability as measured by the IQ test and achievement in reading and arithmetic was diagnostic of learning disabilities. To increase the consistency and objectivity of LD diagnoses, the classification rules were incorporated into a computer program which processed the test scores and behavioral observation ratings. Any youth who achieved at or above the expected grade level for his age on the achievement tests or whose full-scale IQ score was less than 69 was automatically classified as non-learning disabled by the program. Using this procedure, 512, or 26%, of the sample were classified as learning disabled. Examination of the test scores revealed that a large majority of these learning-disabled adolescents had much better quantitative, or performance, skills than verbal competence.

Each youth was interviewed to obtain information about his involvement in delinquent activities, prior encounters with the police, attitude toward school, tendency to give socially desirable responses, and sociodemographic characteristics. In addition, a search of the juvenile court records was made in each of the cities to gather information about each boy's official involvement with the juvenile

justice system. From these data, measures of frequency and seriousness of self-reported delinquent behavior, previous arrests, school attitude, social desirability response tendency, and previous adjudications were constructed.

Advanced statistical techniques, including causal modeling and logistic regression, were utilized to detect the presence of a relationship between learning disabilities and delinquency and to evaluate the hypotheses set out in the preceding section. With data gathered in a nonexperimental or survey research design, such as the one used for this cross-sectional study, it is impossible to prove cause and effect. The analytic methods that we employed provided a means of determining if the data were consistent with a set of causal hypotheses. They also gave us the important capability to reject hypotheses about causal relations which were not consistent with the data. In general, however, data may be consistent with more than one set of causal hypotheses. Some caution, therefore, needs to be exercised when interpreting the results of our causal analyses. In sum, causal analysis enabled us to determine which causal hypotheses were consistent and which were inconsistent with the data, but it could not be used to prove that any causal hypothesis, which might have been consistent the data, was--in fact--true.

The evidence for the existence of a relationship between LD and self-reported delinquent behavior was statistically significant; that is, the observed relationship was not likely to have been the product of chance events in sampling or measurement. Learning-disabled adolescents reported that they had committed an average of 266 delinquent acts during their lives. This is 81 more than the corresponding mean number of delinquent acts for the non-learning-disabled participants (185). Although the mean difference in seriousness of general delinquent behavior between learning-disabled and non-learning-disabled groups was not significant, the groups did differ significantly in frequency of violent acts, e.g., assault with a dangerous weapon and gang fighting, in amount of marijuana and alcohol use, and in number of school discipline problems.

Learning disabilities were also strongly related to official delinquency. Weighting the sample to make it representative of the U.S. youth population, we found that the probability of being officially adjudicated for learning-disabled boys was .09, while the probability of adjudication was only .04 for their non-learning-disabled peers. Thus, the results indicate that on a national basis 9 of every 100 young males with learning disabilities have been officially adjudicated delinquent. This contrasts with the adjudication rate of boys who are not learning disabled, which indicates that only 4 per 100 have become official delinquents. Expressed in a different form, the odds of being adjudicated were 220% greater for learning-disabled than non-learning-disabled adolescents. The odds ratio for being taken into custody by the police was similarly greater for the participants with LD. Finally, the incidence of learning disabilities among the adjudicated delinquents was 36%, indicating that a substantial proportion of the population of official delinquents is handicapped by learning disabilities.

The statistical results led to the rejection of the spuriousness hypotheses concerning sociodemographic characteristics and response bias. Differences between learning-disabled and non-learning-disabled groups in mean self-reported delinquency and in probability of adjudication were somewhat reduced, but were still statistically significant, after the effects of socioeconomic status, intactness of the family, number of children in the family, and ethnicity had been controlled statistically. Thus, only a minor portion of the association between LD and delinquent behavior could be attributed to the spurious influence of the particular sociodemographic characteristics measured in this study. The response bias hypothesis was rejected on the basis of similar results. The conjecture that learning-disabled youths would conceal less of their delinquent activities during the assessment interview was not confirmed.

Four of the remaining five hypotheses received support from the statistical analysis. First, using (positive-negative) attitude toward school as an indicator of school failure, the findings supported the hypothesis that learning disabilities produced school failure which, in turn, led to delinquent behavior. Even though the analysis demonstrated that the school failure hypothesis was consistent with the data, there was not sufficient information available to determine which specific causal processes, e.g., frustration/aggression or economic incentives, were the bases of this effect.

Second, the susceptibility hypothesis was supported by results indicating that some of the effect of LD on delinquent behavior occurred directly, i.e., without being mediated by school failure. This significant result strongly suggests that characteristics associated with learning disabilities, such as inability to anticipate future consequences of actions and irritability, contributed directly to delinquent behavior. Analyses were conducted to determine if some groups of learning-disabled adolescents were more susceptible to delinquency than others. No differences in degree of vulnerability were found for groups varying in age, ethnicity, or socioeconomic status.

Third, the results were consistent with the differential arrest hypothesis. Learning-disabled youths were more likely to have been arrested than were their non-learning-disabled counterparts who reported committing offenses with equal frequency and seriousness. The available data did not permit us to ascertain the basis for this result. Among other reasons, it may have occurred because of the learning-disabled child's impaired intellectual ability to escape detection and inability to dissemble during encounters with the police. Alternatively, it may have occurred as a result of the policeman's negative reaction to the learning-disabled child's abrasive behavior.

Fourth, the differential adjudication hypothesis received strong confirmation. Even when differences in sociodemographic background, frequency and seriousness of self-reported delinquent behavior, and probability of arrest were controlled statistically, the learning-disabled teenagers in the sample had a significantly higher probability of being officially adjudicated delinquent than did their peers who were not handicapped by learning disabilities. It is not clear which causal process was at work. We can not determine, for example,

whether learning-disabled youths were treated differently by juvenile justice officials or whether the cognitive or communication deficits of learning-disabled youths prevented them from effectively defending themselves. Obviously, however, some of these kinds of processes were at work.

The differential disposition hypothesis was rejected. After officially adjudicated groups of learning-disabled and non-learning-disabled boys were equated statistically for differences in background characteristics and delinquent behavior, there was no evidence that the learning-disabled delinquents had a greater likelihood of being confined to a corrections facility. Thus, for comparable offenses learning-disabled and non-learning-disabled youths received equally severe punishments.

In summary, the results of the causal analyses indicated that learning disabilities increased the frequency of self-reported delinquent behavior and the probability of arrest and adjudication. The boys with LD had significantly higher overall rates of delinquent behavior. Learning-disabled youths were especially more likely than their non-learning-disabled peers to have committed violent offenses and theft, to have used alcohol and marijuana, and to have been more disruptive in school. The likelihood of having been arrested and adjudicated was substantially higher for the teenagers handicapped by learning disabilities. The greater delinquency of learning-disabled teenagers could not be explained on the basis of sociodemographic characteristics or tendency to disclose socially disapproved behaviors. These results led to the rejection of the sociodemographic characteristics and response bias hypotheses and to the conclusion that the LD-delinquency relationship was not spurious. The data were consistent with the school failure hypothesis showing that boys afflicted by learning disabilities had experienced greater school failure (as indicated by more negative attitudes toward school), and that this failure in school contributed to increases in delinquent conduct. Also supported by the data was the susceptibility hypothesis, which held that among boys who had equally poor school attitudes, those with LD would engage in more frequently in criminal activities. This result suggests that cognitive and personality characteristics associated with learning disabilities, such as lack of impulse control and irritability, contributed directly to increases in delinquency.

For comparable offenses learning-disabled youths had higher probabilities of arrest and adjudication than teenagers who were not learning disabled. The differential arrest and adjudication hypotheses, therefore, were the differential rates of arrest and adjudication for the same illegal acts suggested that the cognitive and social deficiencies of learning-disabled teenagers, such as poor verbal skills and social abrasiveness, may have prevented them from contributing effectively to their defense in juvenile justice proceedings or from receiving the same treatment accorded youths who did not suffer the negative effects of LD. Among adjudicated delinquents, however, those with LD were not more likely to receive a more severe disposition from the court. Thus, the differential disposition hypothesis failed to receive support.

Longitudinal Investigation

The sample for the longitudinal study comprised 351 boys from the group of 973 official nondelinquents contained in the cross-sectional sample, who had been selected from the public schools of Baltimore, Indianapolis and Phoenix. These boys were reinterviewed concerning their delinquent behavior and school attitude at one- and two-year intervals after initial testing. In addition, court records were searched for information about any official contacts the boys had had with the juvenile court during the two-year period following the initial data collection. At the outset of the study the mean age of the follow-up sample was 14 years. It had the following ethnic composition: 60% white, 27% black, and 13% other minority. The sample contained 57 boys, or 16%, who were classified as learning disabled. The objective of this investigation was to determine if learning disabilities were related to delinquency by observing whether increases over time in delinquent behavior and adjudications were greater for the learning-disabled than the non-learning-disabled boys.

The results of the longitudinal analyses generally agreed with those obtained from the cross-sectional study. LD and indices of delinquent behavior were significantly related, such that the average increase in frequency and seriousness of self-reported delinquent behavior was significantly greater for learning-disabled than non-learning-disabled boys. In addition, the learning-disabled participants had a significantly higher probability of being apprehended by the police during the two years of the study. During this time interval, petitions (i.e., official charges) were filed for 9% of the learning-disabled participants and 4% of the non-learning-disabled youths according to the court records review. These percentages are exactly the same as those obtained in the cross-sectional comparison (above). The 5% difference in this case, however, was not statistically reliable because of the smaller sample size and consequent reduction in statistical power.

The differences between learning-disabled and non-learning-disabled teenagers in mean change in self-reported delinquent behavior remained significant even after possible differences in sociodemographic backgrounds and tendencies to give socially approved responses were controlled statistically. Thus, the hypotheses about spuriousness of the LD-delinquency relationship due to sociodemographic characteristics and response bias were rejected.

The school failure hypothesis was not confirmed, because in the longitudinal sample learning disabilities were not associated with more negative attitudes toward school. It should be noted, however, that the range of individual differences in school attitude was greatly restricted in the longitudinal sample in comparison to the range found in the cross-sectional sample. This could easily account for the small mean difference in school attitude (failure) between learning-disabled and non-learning-disabled participants.

Results showed that the susceptibility hypothesis was consistent with the data. The direct contribution of LD to the increase in delinquent behavior was statistically significant for the seriousness measure and

marginally significant for the frequency index. Thus, as officially non-delinquent boys advanced through the teenage years, those handicapped by learning disabilities experienced significantly greater increases in delinquency. It seems reasonable to infer that the cognitive and social impairments associated with LD contributed directly to the growth of antisocial behavior. Additional analyses indicated that among children with learning disabilities those from families with higher parental education and occupational prestige and those that were white were most vulnerable to the effects of LD. These groups evidenced significantly greater increases in delinquent behavior over time than did their peers.

As in the cross-sectional study, the differential arrest hypothesis was consistent with the data. Among adolescents with similar sociodemographic characteristics who had committed comparable offenses, those suffering from learning disabilities had a significantly higher probability of being arrested. In fact, the odds of being taken into custody were 200% greater for the learning-disabled than the non-learning-disabled teenagers. This result agrees closely with that reported for the cross-sectional study. Partial support was obtained for the differential adjudication hypotheses. Learning-disabled youths who had been arrested did have a greater likelihood of being officially adjudicated than did their non-learning-disabled peers who had committed comparable offenses. However, the actual number of cases was too small to permit statistically reliable conclusions. Finally, as in the cross-sectional study the differential disposition hypothesis was not supported.

In summary, the results of the longitudinal analyses were generally consistent with those of the cross-sectional study. There was convincing evidence that learning disabilities were associated with increases in delinquent activities and official contacts with the juvenile justice system. Furthermore, this association was not explainable on the basis of sociodemographic characteristics or tendency to give socially approved responses. Since learning-disabled and non-learning-disabled boys did not differ in their attitudes toward school, the hypothesized indirect effect of LD on delinquent behavior through school failure could not be confirmed. Learning disabilities did make a significant direct contribution to increases over time in illegal activities, suggesting that the intellectual and personality impairments associated with LD played an important role in producing delinquent behavior. The results also indicated that the negative effects of LD in fostering delinquency were more pronounced for some subgroups than others. Specifically, youths who were white or who from families with higher parental education and occupational prestige experienced relatively larger increases in delinquent behavior. The probability of official contacts with the juvenile justice system for comparable offenses was higher for the learning-disabled than the non-learning-disabled participants. The results were statistically significant for the likelihood of being arrested and almost significant for the probability of being adjudicated. Whether these differences were due to the cognitive deficiencies of the learning-disabled adolescents or to the negative reactions of law enforcement and juvenile justice personnel to teenagers with LD or to both could not be ascertained. Following adjudication, the probability of confinement to a youth correctional institution did not differ significantly for learning-disabled and non-learning-disabled boys.

Implications

The findings of the cross-sectional and longitudinal studies of the relationship between learning disabilities and delinquency carry important implications for the design of future research and the formulation of public policy. NIJJDP funded these investigations in order to obtain a definitive answer to the question of whether there was a link between LD and self-reported and official delinquency. The results summarized above should resolve the issue for all practical purposes. The strong evidence for a relationship between learning disabilities and delinquency should prove convincing to researchers, educational practitioners, juvenile justice officials, and policymakers. The findings indicate that the relationship is quite complex, reflecting such factors as school failure, susceptibility, and differential arrest and adjudication. By and large, the data were consistent with causal hypotheses which describe the general ways in which learning disabilities contribute directly and indirectly to delinquent behavior. Of course, LD is only one among many causes of delinquency. Only a relatively small proportion of the youth population is affected by LD. Within this group, however, learning disabilities appear to be one of the important causes of delinquency.

Compared with previous investigations of the LD-delinquency relationship, the present studies include the largest and most representative samples, the most comprehensive assessments of learning disabilities and delinquency, the most systematic research designs and procedures, and the most sophisticated statistical analyses. In an era of diminishing resources to support research, it seems highly doubtful that any study of sufficient scope to challenge the authority of the cross-sectional and longitudinal investigations reported herein will be funded. Although additional research is certainly needed, it is recommended that the present findings, in combination with the other research done to date, be used to guide the formulation of juvenile justice and educational policy. We believe that this research provides a sound basis for informed action.

The findings demonstrate that adolescents handicapped by learning disabilities are a relatively high risk group for delinquency. This implies that juvenile justice, human services, and educational agencies should target special prevention and rehabilitation programs for this population. Learning-disabled youths comprise a substantial percentage of those who have been officially adjudicated, with most estimates falling in the 30%-50% range. Some rehabilitation programs, such as the ACLD remediation program (see below), have proven effective in remediating academic deficiencies and reducing future delinquency. Although further research is needed to identify the specific causal processes by which LD affects delinquency, we should not wait until the locus of causation has been completely circumscribed before embarking upon expanded prevention and rehabilitation programs.

Remediation programs can be designed to address several of the hypothesized causal processes simultaneously. The availability of these kinds of rehabilitation services should be expanded. Most practitioners and researchers believe that it is important to identify and offer

special services to learning-disabled children before they become official delinquents; that is, while they are still at an early age. Although there is no firm evidence to support this contention, such a prevention strategy for predelinquent learning-disabled children is reasonable enough to warrant immediate implementation and evaluation. In order to be optimally effective, special delinquency control and prevention programs for learning-disabled children and adolescents will require the close cooperation and coordination of juvenile justice, educational, and youth services agencies.

Learning-disabled youths' relatively greater probability of arrest and adjudication for offenses comparable to those of non-learning-disabled teenagers suggests that special court services may be needed to offset the disadvantage suffered by this handicapped group. Training programs on the difficulties confronted by learning-disabled youths in the juvenile justice system could be helpful in augmenting the skills of police and probation officers, prosecutors, defense attorneys, and judges to deal effectively with this group of youthful offenders. Thoughtful consideration ought to be given to special court procedures for handling learning-disabled youths. Recently several of these have been proposed, and some courts have adopted them already.

Having noted the significant policy implications deriving from the cross-sectional and longitudinal studies, it is now appropriate to consider briefly the continuing gaps in our knowledge about LD and delinquency. These very much need to be addressed by future research. Six questions, ranked in approximate order of importance, are proposed for further study. First, which specific causal processes underlie the relationship between learning disabilities and self-reported and official delinquency? A variety of factors have been suggested as the basis for the school failure, susceptibility, differential arrest, and differential adjudication hypotheses. For example, frustration/aggression, labeling, association, bonding, economic incentives, attribution of responsibility, inability to anticipate future consequences of acts, irritability, social abrasiveness, inability to dissimulate, and lack of verbal comprehension and communication skills have been proposed. Although it is theoretically possible that all of these (and more) could be involved, it is likely that only a few play comparatively major roles. It is of paramount importance to determine the relative influences of these causal processes. This information is necessary in order to design prevention and rehabilitation programs which are maximally efficient. Research to obtain this information would be difficult to design and carry out effectively. However, the results would have great value and would be useful in understanding the causal dynamics of delinquency--not just the delinquency of those with learning disabilities.

Second, do learning-disabled students commit a disproportionate number of the violent offenses in schools? Results of the cross-sectional study revealed that boys with learning disabilities engaged in more violence, e.g., assault with a dangerous weapon and gang fighting, and experienced more school discipline problems than their non-learning-disabled peers. This suggests the possibility that the school might be the site of much of the learning-disabled adolescent's aggression. If school failure produces frustration and anger, then one might expect that much of it would be vented in close spatial and temporal proximity to school.

Third, do learning-disabled juvenile offenders have a higher probability of becoming career youthful and adult criminals? Considering the intellectual impairments and negative personality traits which frequently characterize learning-disabled adolescents, it is reasonable to suppose that they have less capability than the average offender to withdraw from a pattern of crime once it has been started. The general lack of appropriate remedial and other rehabilitative services increases the plausibility of the hypothesis that learning-disabled youthful offenders are at greater risk of becoming career criminals than are non-learning-disabled delinquents.

Fourth, are there particular intellectual, personality, social, educational, or family characteristics which either mitigate the deleterious effects of LD or make the individual more vulnerable to them? The results of one analysis in the longitudinal investigation indicated that learning-disabilities made a bigger contribution to the growth of delinquency in children from middle-class families than they did to the development of delinquent behavior among learning-disabled children from lower-class families. Perhaps the middle-class family placed greater stress on achievement or fostered the development of high self-expectations of school success. This could have produced relatively more strain and delinquency when the youth failed academically as a result of his learning disabilities. Conceivably there is a wide array of personality, cognitive, social, and other attributes which serve to increase or decrease the vulnerability of the child with LD. For example, one might suspect that learning-disabled children are more likely to have conflictual relations with their parents or to be abused by them. The hyperactivity, irritability, and lack of attention of children with LD could be expected occasionally to elicit strong negative parental reactions. Social control theory would predict higher rates of delinquency for learning-disabled youths if they did not experience the warm and supportive relations needed to bond, or attach, them strongly to their families. Learning-disabled children who have been abused may become exceptionally vulnerable to environmental stress, peer pressures, and other influences and, consequently, disproportionately violent. It would be extremely valuable to know what factors heighten or decrease the vulnerability of children with LD. With this knowledge, the learning-disabled youths at greatest risk for delinquency could be identified and given special assistance. It might event be the case that some of the mitigating traits could be trained as part of a prevention or rehabilitation strategy.

Fifth, can a method for assessing the presence of learning disabilities be devised which is faster and less costly but equally valid and reliable? The assessment technique developed for this research project required a professionally trained examiner to administer four individual tests of intelligence, achievement, and visual perception and to carefully evaluate the adolescent's behavior while taking the tests. Following testing, which usually lasted for 3.5 hours, the tests had to be scored by a specially trained professional. Then the test scores were entered into a computer to be objectively evaluated by a program, which consisted of rules for defining and counting significant discrepancies between the scores. This assessment procedure is probably too expensive, time-consuming, and demanding of expertise, which is in relatively short

supply, to be useful for large-scale prevention or even relatively limited remediation programs. Clearly the need exists for a method that provides quick, accurate, and inexpensive identification of learning disabilities. Exploratory analyses of the test data from the cross-sectional sample suggest that reliable assessments could be made on the basis of considerably less information. It seems possible to devise objective, reliable, and accurate means of assessing learning disabilities from the kinds of scores usually contained in school records or from a quick test (requiring less than one hour to complete), which teachers or probation officers could be easily trained to administer and score. The development of this type of assessment procedure would greatly facilitate implementation of the preceding policy recommendations and investigation of the questions proposed for future research.

Sixth, do learning disabilities affect girls in the same way as they do boys? The cross-sectional and longitudinal analyses were based only on data from male adolescents. Are girls who suffer from learning disabilities at greater risk for delinquency than their non-learning-disabled peers? Although the percentage of girls who are officially delinquent and the percentage of girls who are learning-disabled are appreciably smaller than the corresponding percentages for boys, the question is, nonetheless, socially significant. Rationales can be advanced which would lead one to predict that LD would have both greater and lesser effects on girls than boys. Certainly this issue deserves to be resolved in the only way possible--by empirical study.

While there are numerous other issues which could be raised, this section concludes having presented six questions which are deemed to be of utmost importance. Now we consider the evaluation of the ACLD academic remediation program.

Effectiveness of the ACLD Remediation Program

Under the sponsorship of NIJJDP, the Association for Children with Learning Disabilities (ACLD) developed and conducted a program of remedial instruction for official delinquents with learning disabilities from 1977 to 1979. The major goals of the remediation program were to improve academic achievement and to prevent or control future delinquency. The National Center for State Courts was commissioned by NIJJDP to evaluate the effectiveness of the ACLD remediation program while working closely with the ACLD staff responsible for designing and implementing the program.

Design of the Program

The remediation program was based on an academic treatment model that provided direct instruction in the youth's functional areas of greatest learning deficiency, e.g., expressive language, reading, or arithmetic. Trained specialists in learning disabilities worked with participants individually or in small groups. Typically remedial sessions, which lasted approximately 50 minutes, were held twice weekly in convenient locations, such as public schools, training schools, and community

centers. The LD specialist and participant worked to improve the youth's academic skills and his or her attitude toward school. A performance-based educational model was adopted, in which clear learning goals were established individually for each participant, curriculum materials were carefully chosen to be compatible with the adolescent's strongest learning modality (visual, auditory, tactile, or motor), and teaching strategies and goals were constantly re-evaluated on the basis of regular objective assessments of the child's progress.

ACLD used the school failure hypothesis to provide the rationale for the academic treatment program. It was assumed that learning disabilities cause school failure, which produces strain, frustration, and negative self-concept; these, in turn, result in delinquency. Thus, in this "strain" version of the school failure hypothesis, LD was conceived as an indirect cause of delinquency, its effect being transmitted indirectly through poor academic performance. It was hypothesized that future delinquency could be controlled or prevented by remediating the academic deficiencies of learning-disabled delinquents. Remedial instruction would increase learning skills and decrease academic failure, which, consequently, would reduce the likelihood of future delinquent behavior and adjudication.

Method of Program Evaluation

The evaluation research was designed as a true experiment in which teenagers who had been officially adjudicated delinquent were randomly assigned in approximately equal numbers to the remediation group or to a control condition. Members of the remediation group participated for varying lengths of time, ranging from a few weeks to two years. The average amount of instruction received was 30 hours. Members of both remediation and control groups continued to receive whatever regular or special educational services were normally available to them. The instructional program was offered to the remediation group participants as a supplement to their usual programs.

Male participants were drawn from the sample of official delinquents in the cross-sectional study. Female participants were selected by the same procedure from the same juvenile courts and training schools described earlier for the male cross-sectional sample. The original plan had been to include in the evaluation only delinquents classified as learning disabled by the computerized decision rules. Logistical problems, however, caused the inclusion of some low achieving, but not learning-disabled, participants. Most of the analyses summarized in this report used data from only the participants with LD.

Before remediation commenced, all members of the remediation and control groups were pretested under the supervision of ETS on the KeyMath Diagnostic Arithmetic Test and the Woodcock Reading Mastery Test. In addition, some of the participants were administered a story-writing test specifically constructed for this study to measure written language expression. As described above for the cross-sectional study, participants were interviewed concerning their previous delinquent activities and attitude toward school.

At the conclusion of remediation, approximately one year after its start, the KeyMath, Woodcock, and story-writing tests were readministered to the members of the remediation and control groups. In addition, posttest measurements were made of school attitudes and self-reported delinquent behavior. A survey of court records yielded information about the participants' official contacts with the juvenile courts before and during the remediation program. Pretest and posttest data were available for 120 learning-disabled members of the remediation group and for 110 learning-disabled members of the control group. This sample, which consisted primarily (89%) of males, was ethnically diverse: 45% were white; 38% were black; 10% were Hispanic; 6% were American Indian; and 1% were members of other ethnic groups. The average age at the beginning of the study was 15.2 years, spanning a range from 12 to 17 years. Pretest and posttest data were also available for 59 non-learning-disabled participants, 33 of whom received remediation and 26 of whom were in the control condition.

Several advanced statistical methods--including generalized, piece-wise, and logistic regression, multivariate analysis of covariance, and causal models--were used to address a variety of questions concerning the effects of remedial instruction. Three general questions were answered in the evaluation. First, did remedial instruction improve the academic achievement of the learning-disabled delinquents? Second, was self-reported and official delinquency reduced by the remediation? Third, did increases in academic skills lead to decreases in delinquency?

Educational Improvement as a Result of Remediation

The data analyses revealed several effects of remediation on educational change. Modest overall gains in scholastic achievement due to remedial instruction were readily observable for the learning-disabled participants. The remediation group showed greater relative gain than the control on every test of educational achievement, although the differences did not reach the levels required for statistical significance for every test. As is typically found in evaluations of instructional methods, the tests designed specifically for the evaluation proved more sensitive to the effects of remediation than the standardized tests. Greatest improvements were observed in the areas of written language expression and arthmetic.

Additional analyses indicated that the effectiveness of remediation both the amount of instruction received and certain personal and intellectual characteristics of the participants. There was evidence that gains in achievement did not rise in a smooth incremental fashion as the number of hours of remediation increased. Instead, there was a substantial increase (jump) in educational improvement after a certain amount (threshold) of remedial instruction had been provided. Significant threshold effects were obtained for reading and written language expression. In general, educational gains were nonexistent below the threshold but significant beyond the threshold values, which typically fell in the range of 55 to 65 hours of instruction. Thus, the form of the relationship between academic change and amount of remediation could be described as a step function, where substantial and equal improvement occurred for those participants receiving at least the threshold level of instruction.

Remediation proved to be especially effective in fostering school-related skills among learning-disabled youths with particular characteristics. Subsamples varying in age, ethnicity, IQ, and pretest achievement level differed significantly in average Woodcock reading and KeyMath arithemitic gains. Among teenagers with low performance aptitude (IQ scores from 64 to 88), remediation was most effective in raising the arithmetic and reading scores of those who were 12 through 15 years of age. For teenagers with high performance IQ (103 to 130), however, those who were 16 or older improved relatively more during remediation. Although there were slight variations in this pattern on the Woodcock test for different ethnic groups and for participants who differed in initial skill level, the same major pattern was evident for most ethnic and pretest subgroupings. In many instances the magnitudes of the differences in mean change between remediation and control subgroups were large. For example, the differences were in excess of one grade equivalent unit on the KeyMath and one standard deviation on the Woodcock. Thus, remediation produced substantial gains for certain subgroups which were distinguishable in terms of their age, IQ, ethnicity and initial skill level. These findings for reading and math are consistent with the results of a growing body of educational research which has found that treatment effects often depend upon the aptitudes and other social characteristics of students. Finally, in contrast to these findings it should be noted that remediation proved uniformly effective in raising written language skills and uniformly ineffective in enhancing school attitude for all of the learning-disabled participants regardless of their age, ethnicity, IQ, or pretest score.

As assessment of the implementation of the remediation program indicated that instruction was accurately targeted to the participant's area of greatest deficiency. For example, those with verbal deficits received relatively more tutoring in reading and spelling, while those with poor initial arithmetic skills were given more remediation in computation, fractions, etc. For the entire program about 58% of instructional time was devoted to reading and language skill development, and 25% was spent on improving arithmetic skills. Several analyses indicated that differential attrition did not threaten the integrity of the evaluation design.

One final finding of interest concerned the relative effectiveness of remediation for the learning-disabled and non-learning-disabled participants. (Recall that a small number of non-learning-disabled delinquents had been inadvertantly assigned to remediation and control conditions). The results suggested that those delinquents with LD may have experienced greater educational improvement as a result of remedial instruction than their counterparts who were low achievers but did not have the significant discrepancies among their test scores that were required in order to be classified as learning disabled.

In summary, remedial instruction produced modest overall gains in scholastic achievement. In general, however, the effectiveness of remediation depended upon the amount of remedial instruction received and the personal and intellectual attributes of the participants. Educational improvement was greater for those participants who received a minimum of 55 to 60 hours of instruction. In general, remediation

produced larger academic gains among younger-low IQ and among older-high IQ subgroups. Participants with LD appeared to derive greater benefit from the program than those who were low achievers but not classified as learning disabled. There was little evidence that remediation enhanced attitude toward school.

Delinquency Reduction as a Result of Remediation

Overall, the remediation and control groups did not differ significantly in average delinquency reduction except on one measure of recidivism, number of official charges. The results indicated, however, that significant reductions in self-reported and official delinquency did occur depending upon the amount of remediation received and the personal and intellectual attributes of the participants.

The relationship between relative reduction in delinquency and amount of remediation could be characterized as a step-down function, in which a substantial decrease in delinquency occurred after a threshold level of instruction had been received. The threshold value was 40 hours for the self-reported measures of antisocial behavior, and 50 hours for the three measures of official involvement with the juvenile courts. In sum, the threshold analyses indicated that remediation consisting of at least 40 to 50 hours of instruction was significantly effective in preventing or controlling future delinquency.

Analyses were carried out to determine if the effect of remediation on delinquency also varied as a function of some of the participants' characteristics. The effectiveness of the remediation program in reducing both self-reported and official delinquency was found to depend upon the age, performance IQ, ethnicity, and prior history of delinquency of the learning-disabled participants. On measures of self-reported delinquency, remediation proved more effective in reducing the delinquent behavior of those youths who had low pretreatment delinquency scores. Remediation significantly reduced the official delinquency of several subgroups of the sample as measured by number of adjudicated charges, seriousness of adjudicated charges, and severity of dispositions. Among the ethnic groups, remediation was more efficacious in reducing the recidivism of blacks than of whites or other minorities. As with self-reported delinquency, remediation produced more beneficial outcomes for participants with low initial levels of official delinquency. When considering the joint effects of ethnicity and pretest delinquency, a more complicated pattern emerged. Remediation was effective in preventing further official delinquency for white participants who were younger (12-14 years of age) and had lower pretest scores, of other minority delinquents who were older (16-17 years of age) and had higher pretest scores, and of black teenagers at all age and pretest levels. Finally, learning-disabled youths with below average performance IQ scores (less than 100) decreased their official delinquency as a result of their participation in the remediation program.

These results provide substantial support for the contention that under certain conditions remediation can be effective in reducing delinquency. As reported above, beneficial effects of remediation for various subgroups of the sample were also observed with respect to

improvement in academic achievement. The subgroups which gained most in educational skills as a result of remediation, however, were not the same subgroups for which remediation produced the largest reductions in delinquency. As a final note to this section, it is perhaps important to discuss the analyses comparing the effects of remediation for learning-disabled and non-learning-disabled participants. The results indicated that reductions in delinquency attributable to participation in the remediation program were significantly greater for those delinquents identified as learning disabled than for those low achieving delinquents who were not similarly classified.

In summary, remediation produced significant reductions in self-reported delinquent behavior and official delinquency for various subgroups which received sufficient amounts of instruction or possessed certain personal and cognitive attributes. Participants had to work with the LD specialists a minimum of 40 to 50 hours before significant decreases in delinquent activities and recidivism were observed. Participation in the remediation program significantly reduced the self-reported delinquent behavior of those learning-disabled youths who had engaged in relatively less antisocial conduct prior to remediation. The official delinquency of several subgroups was reduced by participation in the program. For example, among participants classified as learning-disabled, remediation was most efficacious in reducing the recidivism of black youths, of teenagers who had less history of official delinquency prior to the study, and of those adolescents whose performance IQ scores were below average. In addition, participation in the remediation program proved significantly more beneficial for the learning-disabled than the non-learning-disabled delinquents.

Delinquency Reduction as a Result of Academic Improvement

Analyses were conducted to evaluate a major premise of the remediation model, viz, that remediation would reduce delinquency by improving academic skills and attitudes. Results indicated that in contrast to our expectation almost all of the effect of remediation on delinquency reduction was direct in nature. There was scarcely any evidence that the beneficial effect of remediation on delinquency resulted from improved educational achievement. Changes in delinquency were not significantly related to changes in academic achievement. There was a strong association between change in school attitude and delinquency change. Remediation produced negligible enhancements in school attitude, however, and changes in the achievement test scores could not account for the changes in school attitude. In conclusion, the beneficial effects of remediation on delinquency did not seem to result from improvements produced by remedial instruction in academic achievement or school attitude.

The fact that changes in achievement were essentially unrelated to changes in school attitude and delinquency in this analysis does not conclusively establish that educational improvements can not enhance school attitudes or lessen self-reported and official delinquency. There are several possible reasons why the changes appeared unrelated in this study. For example, the fact that the threshold of hours of instruction was higher for the educational measures than for the delinquency indices

may mean that too small a proportion of the sample received enough remediation for the relationship between academic and delinquency change to be observed.

These considerations notwithstanding, the results suggest that the major factor determining the success of the program in preventing delinquency was not academic skills improvement, per se. It seems most plausible that the beneficial effects of remediation were due to the nature of the relationship between the adolescents and the LD specialists. Interactions with the specialist may have had socializing or bonding influences which, according to social control theory, could have inhibited future delinquent behavior. Of course, this does not mean necessarily that the substance of their activity (teaching-learning) was unimportant. Remediation may have been precisely the kind of situation that was needed to facilitate socialization and attachment, e.g., one in which motivation was aroused, concern demonstrated, traits and values modeled, etc. Furthermore, the fact that educational growth, per se, is valuable should not be discounted. The analysis does demonstrate, however, that change in neither academic achievement nor school attitude was essential for delinquency reduction. Finally, the results suggest that if the remediation program model could be modified in order to produce a more substantial impact on school attitude, then the effectiveness of the remediation program in preventing delinquency would be enhanced.

Implications

The evaluation of the ACLD remediation was designed to address a question with significant implications for public policy, viz., is diagnosing and treating adjudicated delinquents with learning disabilities an effective method for reducing or controlling their future delinquency? Simply put, does academic remediation rehabilitate learning-disabled delinquents? The results summarized above indicate that the answer is a qualified yes. Remediation did reduce the likelihood of future delinquent behavior and official contacts with the juvenile justice system under certain conditions. If sufficient hours of instruction were received or if the learning-disabled participant possessed certain sociodemographic and intellectual characteristics, then delinquency was reduced. These results imply that performance-based educational programs, which use direct instruction techniques, would help reduce the delinquency of adolescents handicapped by learning disabilities. Therefore, it is recommended that these kinds of programs be implemented in a variety of contexts. For example, the ACLD program model could be integrated into existing school curricula, established as independent alternative educational programs, used as one of the academic components in training schools, and adopted as a supplementary tutoring service by youth services agencies.

The potential demand for these programs is very large; consequently, the social benefit to be derived from their implementation could be of great magnitude. Although learning disabilities afflict a relatively small fraction of the total youth population (4 to 10%), a substantial fraction (36%) of those who have been officially adjudicated suffer this handicap. Thus, across the nation there are possibly hundreds of

thousands of youthful offenders who could be rehabilitated to some degree by academic remediation. Policymakers should also consider the possible delinquency prevention benefits of providing remedial instruction for learning-disabled predelinquents, i.e., children who have not yet penetrated the juvenile justice system. If remediation were effective in preventing these children, who have a relatively higher risk for delinquency, from ever becoming delinquent, then the national constituency for LD remedial services would number in the millions.

In a time of diminishing resources for juvenile justice and educational agencies, serious efforts must be made to find the most efficient methods for implementing and operating educational programs based on the ACLD model. The National Center has been a very involved participant in the planning, operation, and evaluation of both the ACLD remediation program and the subsequent ACLD training institutes for juvenile justice and educational personnel. This experience has led us to identify the following critical problems and needs that will be associated with any attempt to implement LD remediation programs on a widespread basis.

First of all, there will have to be a major stimulus to local agencies to implement such programs. An initiative from national organizations, such as OJJDP and ACLD, could be very effective in stimulating state and local juvenile courts, correctional institutions and educational agencies to offer remedial services for learning-disabled delinquents and predelinquents. A public awareness campaign should be mounted to provide information to the general public about the potential need for and benefits of delinquency prevention and control among children with LD. More importantly, research results and recommendations should be disseminated to federal, state and local organizations that serve learning-disabled youth. Interest and commitment will have to be developed at the community level in order for the necessary resources to be allocated to providing prevention and rehabilitation services for learning-disabled children and youth.

Secondly, once communities have become interested in and expressed a desire to create these kinds of prevention and rehabilitation services, they will be confronted immediately by the problem of how to implement and efficiently operate these programs. Information and training needs to be made available to local agencies concerning curriculum materials; teacher training; LD assessment; program management; public awareness programs; models for implementing the remedial instruction design in schools, alternative educational programs, correctional facilities, and youth services agencies; approaches to coordinating the resources and demands of the juvenile courts, schools, and other agencies; ideas for revising juvenile justice procedures (e.g., forms) to promote fair treatment of learning-disabled teenagers who have been taken into police custody; and a host of related issues.

Fortunately, some valuable materials have already been devised by ACLD, such as curriculum guides and training packages. Much more is needed, however. A variety of manuals and training materials should be developed. For example, a training manual is needed to help school teachers deal effectively with the special behavioral and learning

problems presented by delinquent students with LD. Instructional films should be produced to help judges, attorneys, and probation and police officers understand the problems of learning-disabled offenders and how they can be dealt with fairly and effectively by the juvenile justice system. There are obvious needs for procedures manuals on LD assessment, local program evaluation, and program monitoring designed to identify subgroups not benefitting maximally from the remedial services.

One of the toughest problems facing local program planners will be to create organizational and management plans that promote coordination of effort by local agencies. Coordination will be absolutely essential to the development of programs that can operate efficiently and serve a large segment of the learning-disabled population. Of course, anyone who has had much experience in this area recognizes that this kind of coordination and cooperation is extremely difficult to achieve. Local efforts would be aided immensely by the availability program models for the coordination of juvenile justice, educational, and youth services agencies.

In order to promote the implementation of LD remedial programs for delinquency prevention and rehabilitation, it seems necessary for some organization to undertake a large-scale program development and training effort. Ideally, it would develop the needed manuals, films, program models and other information resources, sponsor training programs for local officials, and offer technical assistance to interested communities. This kind of help would greatly facilitate the development of programs at the local level. Obviously, one would expect there to be a big difference in the relative effectiveness between simply recommending that prevention and rehabilitation programs be implemented and actually demonstrating the most cost effective ways of creating and operating such programs. It is hoped that the present research and evaluation effort will be followed up by a program to help local communities implement these recommendations.

Several important questions for future research have emerged from the findings of the evaluation analyses. First, can the ACLD remediation model be made more effective by expanding its focus to include affective, social skills, self-management, or prevocational training? There is good reason to expect that it would be, and there is a need for the development of an integrated curriculum. The evaluation results suggest that remediation would be made much more effective if attitudes toward school could be improved. Second, how effective is the ACLD model compared with other treatment approaches, such as perceptual deficit training? Third, by what causal processes does remediation produce its effects (e.g., academic improvement or bonding) and what types of learning-disabled offenders are most benefitted by various modes of treatment? These issues are highly significant and could be studied effectively by micro-analysis of teacher-student interactions. Fourth, can parent effectiveness training or peer groups programs prevent or control the delinquency of teenagers with LD? Some of these kinds of programs have proven effective for other delinquents. Finally, will performance-based educational programs using direct instruction techniques prevent predelinquents who are at risk for delinquency because

of their learning disabilities from ever becoming official delinquents? The educational and social implications of this question are so important that it strongly deserves to be addressed in future research.

In conclusion, this research and evaluation effort by the National Center for State Courts has produced findings of considerable significance to juvenile justice and education. Learning disabilities and delinquency were found to be related. The evaluation determined that a performance-based educational program effectively remediated the academic deficiencies and reduced the delinquency of learning-disabled offenders under certain conditions. These findings clearly show that children and youth handicapped by learning disabilities are at relatively higher risk of becoming delinquent than their non-learning-disabled peers. Furthermore, the risk of future delinquency is reduced by participation in a rehabilitation program designed to provide appropriate remedial instruction. It is recommended that such prevention and rehabilitation services be made widely available to youth with LD. Much work needs to be done on the development of program models and training materials in order to facilitate the implementation of remedial programs. Several important questions concerning the effectiveness of LD interventions have been identified for future research.

The link between learning disabilities and delinquency has been established. Some knowledge now exists about methods for breaking the link. Hopefully, the years ahead will witness increased efforts to prevent and control delinquency among learning-disabled children and youth and additional research to acquire the information needed to make these efforts maximally effective.

LD/JD REPORTS AVAILABLE FROM THE
NATIONAL CENTER FOR STATE COURTS

Thomas B. Barrows, Paul B. Campbell, Billie A. Slaughter, and Mary Louise Trainor. Psychoeducational Diagnostic Services for Learning Disabled Youths: Research Procedures. July 1977. 34 pp. $2.00.

Paul K. Broder and Noel Dunivant. Change in Delinquent Behavior as a Function of Learning Disabilities: A Two-year Longitudinal Study. February 1981. 41 pp. $2.50.

Paul K. Broder, Noel Dunivant, Elizabeth C. Smith, and L. Paul Sutton. Further Observations on the Link Between Learning Disabilities and Juvenile Delinquency. July 1980. 50 pp. $2.50. NCJRS Access No. 75200. (A revised version of this report appears in the Journal of Educational Psychology, 1981, 73, 838-850).

Paul K. Broder and Joel Zimmerman. Establishing the Reliability of Self-reported Delinquency Data. August 1978. 27 pp. $2.00.

Paul B. Campbell. The Definition and Prevalence of Learning Disabilities. March 1978. 19 pp. $2.00.

Paul B. Campbell, Billie A. Slaughter, Paul K. Broder, and Joel Zimmerman. The Link Between Learning Disabilities and Juvenile Delinquency: Interview Guide. March 1977. 11 pp. $1.00.

Paul B. Campbell and Dora S. Varvariv. Psychoeducational Diagnostic Services for Learning Disabled Youth: Validation Analysis. October 1979. 73 pp. $3.50.

Noel Dunivant. The Relationship Between Learning Disabilities and Juvenile Delinquency: Brief Summary of Research Findings. March 1982. 5 pp. No charge.

Noel Dunivant. The Relationship Between Learning Disabilities and Juvenile Delinquency: Executive Summary. December 1981. 25 pp. $1.50.

Noel Dunivant. Causal Analysis of the Relationship Between Learning Disabilities and Juvenile Delinquency. Available June 1982.

Noel Dunivant. Development of Delinquency Among Learning-Disabled Adolescents: A Longitudinal Causal Analysis. Available June 1982.

Noel Dunivant. Improving Academic Skills and Preventing Delinquency of Learning-Disabled Juvenile Delinquents: Evaluation of the ACLD Remediation Program. Available June 1982.

Noel Dunivant. A Note on Differences Between Learning-Disabled and Non-Learning-Disabled Teenagers in Delinquent Behavior. April 1982. No charge.

Fred M. Greguras, Paul K. Broder, and Joel Zimmerman. Records Access and Subject Participation in Criminal Justice Research: A Preliminary Case Study. January 1978. 31 pp. $2.00. (A revised and abridged version of this report appears in the Review of Public Data Use, 1979, 1 (11/12), 87-94.)

Fred M. Greguras, Paul K. Broder, and Joel Zimmerman. Establishing an Operational Definition of Juvenile Delinquency. March 1978. 32 pp. $2.00.

Ingo Keilitz, Michael J. Saks, and Paul K. Broder. The Evaluation of the Learning Disabilities/Juvenile Delinquency Remediation Program: Evaluation Design and Interim Results. August 1979. 75 pp. $3.50. NCJRS Access No. 62075.

B. Claire McCullough and Barbara A. Zaremba. A Comparative Analysis of Standardized Achievement Tests with Learning Disabled and Non-learning Disabled Adolescent Boys. October 1979. 19 pp. $2.00. (A revised version of this report appears in Learning Disability Quarterly, 1979, 2(4), 65-70.)

Barbara A. Zaremba, B. Claire McCullough, and Paul K. Broder. Learning Disabilities and Juvenile Delinquency: A Handbook for Court Personnel, Judges, and Attorneys. November 1979. 65 pp. $5.00.

Joel Zimmerman and Paul K. Broder. Deriving Measures of Delinquency from Self-report Data. April 1978. 49 pp. $2.50. NCJRS Access No. 50483. (A revised version of this report appears in the Journal of Criminal Justice, 1980, 8, 147-162.)

Joel Zimmerman, William D. Rich, Ingo Keilitz, and Paul K. Broder. Some Observations on the Link between Learning Disabilities and Juvenile Delinquency. May 1979. 45 pp. $2.50. (A revised version of this report appears in the Journal of Criminal Justice, 1981, 9, 1-17.)

Order from: Publications Department; National Center for State Courts; 300 Newport Avenue; Williamsburg, Virginia 23185. Make checks payable to the National Center for State Courts.

*A single copy of these reports may be obtained without charge by writing to: NCJRS; P.O. Box 6000; Rockville, Maryland 20850 (Attention: LD/JD R&D Project). Please refer to the paper's access number and title when ordering.

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