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PROGRAM ON HUMAN DEVELOPMENT  
and  
CRIMINAL BEHAVIOR

PHASE II FINAL REPORT

to

the John D. and Catherine T. MacArthur Foundation  
and the National Institute of Justice

December 15, 1989

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## PREFACE

This report presents the conclusions and recommendations of the first two years' work of the Program on Human Development and Criminal Behavior. Jointly sponsored by the John D. and Catherine T. MacArthur Foundation and the National Institute of Justice, U.S. Department of Justice, the Program was created to design and launch an integrated series of longitudinal studies of human development from birth to age 25 focusing on conduct disorder, delinquency, criminality, and other antisocial behaviors. The Program began work in February 1988. During its first phase of roughly one year, three working groups were created to focus separately on "pathways to the onset of conduct disorder," "the onset of delinquency and criminality," and "continuation of criminality and desistance from it." These working groups were chaired, respectively, by Felton Earls, David P. Farrington, and Lloyd Ohlin. The working groups were charged to survey theory, knowledge, instruments and measures, promising intervention experiments, and existing studies in relation to the age groups and developmental stages with which each was centrally concerned. Their reports were completed in December of 1988 and were followed by a second phase in which two working groups were appointed and charged with building on the work of their predecessors to develop a comprehensive design for longitudinal research. This document contains the report of the working group on "research design." The work of the second working group, on "research administration and organization," will continue into the next phase of the Program's activity and yield a final report sometime in 1990.

Simultaneous with delivery of this report to the sponsoring organizations, proposals have been submitted to each agency for support, at the outset, of eight years of program development, data collection, and analyses. If those applications are successful, the Program will, during ensuing phases of its life, be housed at the School of Public Health, Harvard University, under the joint direction of Felton Earls and Albert J. Reiss, Jr. It is contemplated that projects will be fielded in one or more major metropolitan areas after a period of continued development of instruments and measures, execution of pilot studies, completion of plans for data analyses, and selection of research teams and sites. Much of the data collection and other field work will be carried out by scholars who are not now associated with the Program and who will be selected through competitive processes.

During the first two phases of the Program's activity, Lloyd Ohlin and Michael Tonry have served as co-directors and have benefitted from the advice and wisdom of a research advisory board consisting of Albert J. Reiss, Jr. (chair), Alfred Blumstein, Felton Earls, David P. Farrington, Norman Garnezy, Malcolm Klein, Norval Morris, Lee Robins, and James Q. Wilson.

The research agenda set out in this report proposes a series of studies which, if they are carried out, will be the most ambitious and important research on criminality that has ever been undertaken in this country. We have had the good fortune that both sponsoring agencies were prepared to provide funds for extensive planning and consultation with scholars from a wide array of fields. The product, we believe, is among

the most genuinely interdisciplinary plans for research that has been devised in criminology; the fruits of the planning have been worth the expense, time, and effort which they required. James K. Stewart, director of the National Institute of Justice, has offered patience and support for our efforts and, in a policy world in which answers are usually wanted yesterday, has respected the value of careful step-by-step planning. Richard Linster and Joel Garner have offered advice but never intrusion, and our work is the better for their help. At the MacArthur Foundation, William Bevan, at the Program's inception director of the Health Program, and his successor in that position, Denis Prager, have consistently encouraged and supported the interdisciplinary thrust of the entire planning effort. We are also grateful for the support provided by James Furman who, in his former capacity as executive vice president of the MacArthur Foundation, fostered the work of the predecessor Justice Study Group from 1982 to 1986 and the development of this Program.

Our roles in this venture have provided wonderful opportunities for personal growth and a sense of satisfaction in being involved in what may prove to be one of the most important research initiatives ever undertaken in criminology. In this regard we were not alone. The enthusiasm, sense of accomplishment, and intellectual excitement expressed by many of the participants in this planning process have heightened our sense of the potential value of the research proposed in this report. We are grateful for their commitment and unstinting contributions of thought, time, and

energy. As this report is submitted, the baton of the Program's leadership passes to Felton Earls and Albert J. Reiss, Jr., in whom we have enormous confidence and to whom we wish good fortune in the remaining phases of the Program's activities.

Lloyd Ohlin

Michael Tonry

### Acknowledgments

This report is the product of a collective effort. Individuals had responsibility for preparing initial drafts of separate chapters and for preparing successive revised versions. The final versions, however, reflect the views of many people, including the members of the research design working group and the Program's research advisory board. Attachment A to this report identifies the members of both groups. Michael Tonry was the primary writer of Chapter 1. Felton Earls was the primary writer of Chapter 2 on "Theories and Hypotheses," and of the Appendix on "Issues in the Use of Biomedical Measures." David P. Farrington was the primary writer of Chapter 3 on "Accelerated Longitudinal Design" and Chapter 4 on "Experimental-Longitudinal Combinations." Robert Sampson was the primary writer of Chapter 5 on "Community Sampling" and Chapter 8 on "Site Selection." Robert Sampson and David Rowe were the primary writers of Chapter 6 on "Household and Individual Sampling." Kenneth Adams was the primary writer of Chapter 7 on "Sampling Yield," Chapter 9 on "Common Variables," Chapter 10 on "Measurement Issues," Chapter 11 on "Statistical Methods and Analysis," and Chapter 16 on "Preparatory Field Work and Supplemental Studies." Felton Earls and Richard Tremblay were the primary writers of Chapter 12 on "Prenatal and Preschool Cohorts." David P. Farrington was the primary writer of Chapter 13 on "Young Adolescent Cohorts." Kenneth Adams, Lloyd Ohlin, and Robert Sampson were the primary writers of Chapter 14 on "Young Adult Cohorts." David Rowe was primary writer of Chapter 15 on the "Sibling Study."



## CHAPTER 1

### INTRODUCTION

The Program on Human Development and Criminal Behavior (the "Program") has developed a sophisticated, interdisciplinary, and intellectually ambitious agenda for research on the causes and prevention of crime. The agenda includes a series of overlapping longitudinal studies in a single site of seven cohorts of individuals ranging in age at the outset from birth to age 18; one or more full or partial replications of the seven-cohort study in other sites; a linked series of experimental assessments of promising interventions directed at different age groups; and a series of related methodological, statistical, and pilot studies.

#### I. BACKGROUND

This report describes the Program's activities during the past 21 months. The proposed research agenda has generated an unusual amount of intellectual excitement. Partly the excitement results from the interdisciplinary nature of the effort: developmentalists and behaviorists have seldom interacted extensively with the sociologists, social psychologists, political scientists, and lawyers who make up the world of academic criminology. In principle, we all know that interdisciplinary work in the behavioral and social sciences can yield richer insights than can work in a single discipline. In practice, the world of scholarship is balkanized and it is difficult to maintain mastery even of a single field. As our work progressed, it became apparent that each research community had much to learn from others and that genuinely interdisciplinary research

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will significantly advance the current state of knowledge.

Partly the excitement results from the Program's ambition to investigate the natural history of conduct disorder, delinquency, and crime from birth to age 25. In principle, we all understand that the child is father of the man. In practice, research on these subjects is segmented by age. Pediatricians, child psychiatrists, and psychologists focus their research on discrete stages of development from infancy and preschool to adolescence. In criminology, with a few important exceptions, no one studies preadolescents, some groups of scholars study delinquency, others study adult crime.

More than fifty leading scholars from a diverse array of disciplines participated in the past 21 months' work as members of working groups, as members of the research advisory board, as consultants, and as writers of commissioned papers. During ensuing phases of the Program's activities, comparable efforts will be made to elicit widespread participation from scholars of many disciplines.

### A. Policy Context

Violent crime has long perplexed and frightened Americans. That has never been truer than today. Public opinion polls show crime and drug abuse to be the social problems that most disturb Americans.

These broad-based public concerns are justification by themselves for focusing resources and attention on the causes, prevention, and sanctioning of serious crime, but there is another equally powerful justification. Victims of crime and violent criminals are disproportionately members of minority and low-income groups. Among black males aged 15 - 44, homicide

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is the leading cause of death. A black or hispanic American is six times likelier than a white American to be murdered; four times likelier to be raped; three times likelier to be robbed. Nearly half of the American men in prison are black; a black American adult male is eight times likelier to be in prison or jail than is a white American adult male. On any given day, according to some estimates, one of every twelve black American males in his twenties is in prison or jail.

These are miserable social facts about modern America. Being an offender and being a victim are too often entangled with the blighted life chances of the disadvantaged, particularly disadvantaged members of ethnic and racial groups that have historically been the objects of discrimination. Serious efforts to improve our understanding of the causes and prevention of crime and to design and carry out strategies for reducing crime are likely, in the nature of things, to be concerned with improving the life chances of the least well-off in our society.

Unfortunately, policymakers who wish to put in place new programs to reduce crime, or to expand the scope or effectiveness of existing programs, quickly discover that the knowledge necessary to do this responsibly does not exist except in fragmentary and unsatisfactory form. There is nothing new in saying that we do not know enough to mount a well-conceived set of new programs. In the early 1960s, when crime rates in the United States began a dramatic increase that continued to the early 1980s, we knew even less about how to cope with the problem than we do today. The President's Commission on Law Enforcement and Administration of Justice in 1967 summarized the commission's findings with these words: "But what [the Commission] has found to be the greatest need is the need to know." Many

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people nonetheless were in the 1960s comfortably optimistic about the promise of rehabilitation programs; it took a decade or more of research and writing for the realization to sink in that this optimism was misplaced. Others were certain that hiring more police officers and having them engage more frequently in random preventive patrol would cut down on street crime. Again, a decade passed before this certainty was shattered by studies suggesting that feasible changes in levels of preventive patrol would have few or no demonstrable effects on crime rates. Still others believed that the causes of crime could be addressed by programs that provided job training, more schooling, and reduced racial segregation. Job-training and job-creation programs flourished; the proportion of young persons staying in school increased; the most obvious forms of racial segregation were ameliorated. Billions of dollars were spent. Crime continued to rise.

We do not conclude from the experience of the last two decades that efforts at crime prevention and rehabilitation of offenders are wrong or always doomed to failure, that the police can do nothing about crime, or that efforts to attack the causes of crime are a waste of time. We do conclude that broad-brush, inadequately designed, poorly tested programs are not likely to make much of a difference.

So we have as a nation in the 20 years since 1969 learned some things about the control and prevention of crime--albeit more of what won't work than of what will. If, however, we want in the next 20 years, by 2009, to know more than we do now, and we want to see established improved public policies that both reduce crime and improve the life chances of the least well-off among us, new research strategies are required.

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### B. Origin of Program

The Program has since its inception been supported jointly by the John D. and Catherine T. MacArthur Foundation and the National Institute of Justice and builds on earlier initiatives of both sponsors. The Program's origins at the MacArthur Foundation date to the appointment in 1982 of the Justice Program Study Group, consisting of Governor Richard Ogilvie, Daniel Glaser, Norval Morris, Lloyd Ohlin, Herbert Wechsler, and James Q. Wilson. The Study Group produced a book, Understanding and Controlling Crime (1986) by David Farrington, Lloyd Ohlin, and James Q. Wilson, which won the 1988 Award for Distinguished Scholarship of the Criminology Section of the American Sociological Association. In that book, the Study Group reviewed current knowledge about the causes and prevention of crime and concluded that major advances in policy-relevant knowledge require a two-pronged research strategy. First, in order to advance the low level of current understanding of the developmental pathways leading to predatory adult criminality, the Study Group urged investment in long-term longitudinal studies of human development from birth to age 25. Second, in order to test the effectiveness of a variety of promising interventions, ranging from provision of early childhood services to alternate sanctioning policies, the Study Group urged investment in major experimental assessments of intervention programs. The Study Group recommended that longitudinal and experimental studies be combined or linked to the extent feasible in order to enrich both kinds of research.

Moving in parallel, in 1983 the National Institute of Justice funded the National Academy of Sciences Panel on Research on Criminal Careers (the "NAS Panel"); the Panel set out to review knowledge about the causes and

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prevention of crime, with particular emphasis on predatory street crime. The Panel's 1986 report, Criminal Careers and "Career Criminals," urged initiation of longitudinal and experimental studies like those proposed by the MacArthur Study Group.

The case for longitudinal, experimental research of the sort envisioned by the Program's research agenda rests on the following belief: if we are to make progress in developing ways to reduce the criminal behavior of high-rate offenders, we must know things about the contributions to that behavior of early childhood experiences, biological predispositions, peer-group relations, school and family processes, and criminal justice interventions that we do not now know and cannot learn save by studying carefully how young people grow up.

For most high-rate adult offenders, criminality is not an isolated behavior; rather, it is one aspect of an array of behavioral disorders that typically manifest themselves early in life and, absent countervailing factors, become worse as the child enters adolescence. Understanding criminality thus requires that we be able to explain why some children display and others do not display a variety of problems--hyperactivity, weak emotional attachments, short time horizons, an indifference to the feelings of others, attention deficit disorders, and physical aggression. All manner of problems are aggravated by these tendencies--crime and delinquency, family violence, reckless driving, alcohol and drug abuse, sexual precocity, low school performance, and poor employment experiences. Carefully done prospective longitudinal cohort studies coupled with assessments of the effects of experimental interventions can unravel these developmental progressions and suggest useful ways in which the likelihood

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of criminal involvement can be reduced. Such studies are difficult, expensive, and time-consuming. But the alternative to doing them now is to endorse in the future social policies that are based on guesswork, political ideology, or academic fashion. Governments will respond to citizen demands for action against crime and delinquency, whether or not a solid foundation of knowledge exists on which to base those actions. Since crime and other forms of disorder will not only always occur but may increase in intensity in the 1990s as the children of the "baby boom" reach their high crime years, the time to begin the basic research is now.

The Program on Human Development and Criminal Behavior is a direct outgrowth of those earlier MacArthur and NIJ initiatives. The Program officially began its work on February 1, 1988. The Program's aims during its first two-year planning phase were to complete a comprehensive research agenda and to deliver to the MacArthur Foundation and NIJ proposals for projects to carry out that research agenda.

This report summarizes the first 21 months' work and proposes a comprehensive integrated agenda for research on human development and criminal behavior.

### C. Program Planning

Over the past 21 months, we have been designing a comprehensive research agenda for study of the causes and prevention of conduct disorder, delinquency, criminality, and serious antisocial conduct. The major components of that research agenda are described in this report and briefly summarized in this introduction. The proposed program of research has changed substantially since we began work. Understanding and Controlling

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Crime, the MacArthur Study Group's report, illustrated its proposed strategy by calling for six-year longitudinal studies of four cohorts of male and female subjects identified at birth, age 6, age 12, and age 18. The data thereby obtained would be combined to generate a data set covering the period from birth to age 24.

In a variety of ways, our current plans represent substantial elaborations and alterations to those earlier recommendations. First, participation of developmentalists and behaviorists in our work has taught the need to take much fuller account of biological, biomedical, and psychological influences on development than has previously occurred in criminological research. Second, the proposed research would incorporate concern for community and environmental influences on behavior, thus merging three quite separate lines of inquiry--the individual differences perspective, the modern sociologist's class, group, and race perspective, and the classical sociologist's community or ecological perspective. Third, the plan to study 4 successive cohorts for 6 years has given way to a plan to study 7 overlapping cohorts for 8 years (though funding proposals for the next phases of the Program's work will request funds only for developmental work and for the first 4 years of data collection). Fourth, the plan to include female subjects in each cohort has been replaced by plans to include females in a birth cohort and in some, but not all, of the other cohorts. Fifth, the plan to launch simultaneous longitudinal and experimental studies in a single site now appears too ambitious and likely to complicate the longitudinal study unduly. Instead, current plans call for launching of intervention experiments at different sites or at the longitudinal-study sites but several years after the longitudinal work



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begins. The latter strategy makes it possible to formulate intervention hypotheses on the basis of findings from the longitudinal research and then to test the interventions' effects while continuing the longitudinal studies. Other alterations to earlier recommendations that have evolved or changed as a result of the past 21 months' work are described elsewhere in this report.

The Program's activities can be envisioned in five phases.

- Phase I: Review of Knowledge. Examine and summarize the current state of the relevant behavioral and social science research on human development and antisocial behavior from birth to age 25 (one year; completed).
- Phase II: Research Agenda. Prepare a comprehensive, integrated interdisciplinary research agenda for study of the causes and prevention of conduct disorder, delinquency, criminality, and serious antisocial behavior (one year; completed).
- Phase III: Pilot and Preparatory Work. Complete necessary methodological studies, pilot studies, and development of measures and instrumentation; complete plan for research administration and oversight; select research teams and sites (two to three years).

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Phase IV: Field Work. Carry out the first four years of data collection followed by one subsequent year of data analysis (five years).

Phase V: Field Work. Carry out the second four years of data collection followed by one subsequent year of data analysis (five years).

If there is a Phase V, the fourth and fifth phases will be combined to include 8 years continuous data collection and two subsequent years of analysis.

1. Phase I. The Program's first public act, in February 1988, was to convene a meeting in Dallas of 40 leading social and behavioral scientists. We had three aims. First, we wanted to solicit the attendees' reactions to the MacArthur Study Group - National Academy of Sciences research recommendations. Second, we wanted to elicit recommendations on how best to design and carry out such studies. Third, we wanted to conduct a "talent search" to identify people who could contribute needed insights or disciplinary perspectives to our work.

It was apparent before the Dallas meeting, and became clearer afterward, that the Program's contemplated study designs, analyses, and data needs required the formation of interdisciplinary working groups. Accordingly, interdisciplinary teams were formed covering the periods from birth to school entry, school entry to middle adolescence, and middle adolescence to adulthood. The groups were chaired, respectively, by Felton

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Earls (Harvard School of Public Health), David P. Farrington (Cambridge University), and Lloyd Ohlin (Harvard Law School emeritus). The identities, affiliations, and disciplinary specialties of the members of the three groups (and of all other Program participants) are shown in Attachment A to this report. Each group contained six to eight members; half were established senior scholars and half were promising younger scholars.

The working groups met regularly throughout 1988 (Attachment B is a schedule of Program meetings during Phases I and II) and produced exhaustive reports to a common charge: summarize the current state-of-the-art of knowledge; survey the current state of theory; survey and identify relevant variables, measures, methods, and instruments; survey and identify promising interventions for experimental assessment; identify promising ongoing studies for possible augmentation or collaboration and completed studies for analysis or reanalysis. The reports were completed in December 1988. Critical assessments of the reports were solicited from scholars not involved in the Program. (Attachment C lists all papers, consultants' reports, and critiques commissioned during Phases I and II.)

2. Phase II. Two working groups were organized during Phase II. A group on "research design", chaired by Lloyd Ohlin, was charged to prepare a comprehensive research agenda that incorporated the findings of Phase I. This interdisciplinary group included Messrs. Earls, Farrington, and Ohlin, and Kenneth Adams (Castine Research Corporation), David Rowe (University of Arizona), Robert Sampson (University of Illinois), and Richard Tremblay (Montreal). They met seven times over an eight-month period; each member

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prepared written papers, or draft report sections, for each meeting. A preliminary version of their report was completed by early June and was discussed in detail at a meeting of the Program's research advisory board. During summer 1989, major sections of the design group's report were rewritten and critical reactions, especially on the overall design and on data analysis, were sought from methodological and statistical specialists on longitudinal research.

A second working group on "research administration and organization," chaired by Albert J. Reiss, Jr. (Yale), met several times and prepared detailed agendas of organizational and administrative issues to be addressed in carrying out the proposed research agenda. Most of those issues will be addressed, and policies be proposed, during the next phase of the Program's work. The working group's agenda on research administration includes development and standardization of instruments and measures; mechanics for coordination and oversight of research teams at different sites; plans for archiving, analysis, and sharing of data; and processes for addressing human subjects and other ethical issues. The working group's agenda on research organization focuses on the logistics and arrangements for selecting research teams and sites; coordinating projects at different sites and projects funded by different sponsors; assuring quality control; and assuring that plans for data archiving, analysis, and sharing are carried out. To learn from the experience of existing ambitious, multi-site data collection projects, a series of case studies were undertaken. These include the Robert Wood Johnson Foundation's eight-site Infant Health and Development Project, the National Institute of Justice's six-site Spouse Assault Replication Project, and the

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Office of Juvenile Justice and Delinquency Prevention's three-site program of longitudinal delinquency studies. These and additional case studies will be completed during the Program's next phase of activity.

### II. PROPOSED PROGRAM OF RESEARCH ON HUMAN DEVELOPMENT AND CRIMINAL BEHAVIOR

The Program's aim is to advance understanding of the developmental paths that lead to conduct disorder, delinquency, and crime in order to inform public policies concerning prevention of violent and predatory crime and enhancement of the life chances of the disadvantaged.

#### A. Goals and Rationale

The Program will investigate human development from birth to age 25 to learn why some children and adults who have particular characteristics or undergo particular experiences become deviant and some become adult predators, and why others do not. We know, for example, that hyperactivity at age two is predictive of conduct disorder at age 8, which in turn is predictive of shoplifting at age thirteen, which is predictive of robbery at age nineteen, which is predictive of family violence, alcohol abuse, and predatory crime in the twenties and thirties. Of course, not all adult predatory criminals were at earlier ages robbers, shoplifters, diagnosed as conduct disorder, or hyperactive. Many, however, did pass through some or all of those earlier stages. By tracking the life experiences of large numbers of individuals of various ages from birth to 25, we want to learn much more than is now known about two overriding questions: what distinguishes those antisocial individuals who move on to higher, more

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serious stages of antisocial conduct from those who do not; at what ages and developmental stages can intervention programs significantly decrease the proportion of individuals at one antisocial stage who pass on to the next?

One of the Program's premises is that significant advances in understanding of these matters will not occur until substantial investments are made in prospective longitudinal studies of antisocial development. Although there have been a handful of previous longitudinal studies of crime and delinquency, most can offer no more than weak evidence of developmental progressions and causal influences and few or no insights about promising interventions.

By studying individuals from birth to 25 in a research design that simultaneously incorporates concern for individual differences, social and group processes, and community and environmental influences, the Program's research plans move several steps beyond anything that precedes them. The reports from the three Phase I working groups and this report describe in detail the theoretical, conceptual, methodological, and empirical foundations of our research agenda and set out a variety of developmental and criminal careers hypotheses for examination. Most criminologists agree that theories of antisocial conduct must be integrative to be broadly useful. No theory or set of theories applicable to particular age groups applies convincingly to the life span from birth to age 25. In early childhood, for example, temperament and attachment theories loom large, but their applicability to teenagers or adults is much less certain. For adolescents, control, strain, differential association, and subcultural theories have predominated; each has merit; none appears broadly

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persuasive. Much research on adults has been atheoretical. Social learning, social control, rationale-choice, and network theories are the commonly invoked theoretical explanations for adult crime. Thus our research plan, though informed by awareness of all of the modern theoretical explanations of behavior, subscribes narrowly to no single theory or set of theories. Instead, we focus on known developmental patterns and problems, as illustrated by the following seven sets of issues on which our research agenda promises to shed important new light. These sets of issues are illustrative, not exhaustive, and risk oversimplification. They attempt to identify some likely public policy implications of the Program's research agenda.

1. Individual Differences. Most longitudinal criminological research has been guided by a sociological interest in social influences on behavior. Relatively little attention has been paid to the influences of biological, biomedical, and psychological characteristics that constitute risk factors present from the beginning of life. Insofar as biological differences and early childhood experiences set children on the early rungs of developmental ladders leading to delinquency and criminality, understanding of those influences and how they operate can better inform public policy on socially desirable early life interventions.

2. Family Influences. A variety of family characteristics, such as poor parenting practices, are strongly associated with conduct disorder and delinquency. We don't know, however, to what extent these associations are due to family characteristics in themselves or to underlying causes. For



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example, do poor but manipulable childrearing practices increase probabilities of conduct disorder or do inherited temperaments of both parents and children explain both the parents' childrearing practices and the child's unruliness? If the former, then the case for social investment in parenting skills programs is to that extent enhanced. If the latter, other interventions must be developed that structure opportunities and reward the constructive expression of temperamental differences.

3. School Influences. Some delinquents experience important school failures in elementary school. Others exhibit behavior problems without achievement problems. Still others suffer neither achievement nor behavior problems. A longitudinal study beginning at birth and obtaining information on behavior and abilities prior to school entry will better inform efforts to understand the interactions among preschool abilities, school failure, behavior problems, and later delinquency, in order better to inform development of intervention policies.

4. Peer Influences. We know that adolescent boys who become active delinquents associate with delinquent peers, and that boy delinquents often were earlier rejected by conventional peers in preschool or early elementary school. What we don't know are the links between early rejection by conventional peers and later association with delinquent peers. Knowing this would help us decide to what extent intervention with groups of young children to prevent peer rejection and to facilitate entry into normative peer groups will prevent adolescent association with delinquent peers.

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5. Desistance from Crime. Only over the last ten years have serious attempts been made to apply quantitative research methods and advanced statistical techniques to understanding the natural course of criminality. Much more needs to be known about the onset, continuation, variation, and termination of criminal careers. A considerable body of evidence has now accumulated, based mostly on cross-sectional analyses of official criminal record data and offenders' self-reports, that has permitted the beginnings of systematic understanding of life course involvement in crime. One particularly important question to be investigated by the Program's research is how we can best understand the processes by which most individuals desist from active criminality, culminating eventually in a small percentage of active offenders who commit grossly disproportionate numbers of predatory crimes. Nearly all criminal careers research to date has studied adults and older teenagers. By these ages, however, intervention efforts may be too late. To what extent are prenatal and perinatal influences, biomedical differences, and other individual, social, and community influences related to understanding who, among the mass of offenders, ultimately comprise that small percentage of chronic predators? Only by identifying and charting out a variety of different developmental paths or sequences from birth onwards can we begin to achieve the level of understanding of criminal careers that is necessary for humane and effective public policies against crime to succeed.

6. Prediction of Dangerousness. Six to eight percent of active offenders commit as many as half of all crimes reported. Yet efforts to achieve ethically and scientifically acceptable levels of accurate

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prospective identification of high-rate offenders have failed. A high percentage of delinquent children desist from criminality at relatively young ages. Marriage, military service, leaving school, and full-time employment are often associated with desistance from crime by delinquent youths. There is a pressing social need to identify those individuals who are the poorest prospects for desistance, both for purposes of designing early intervention programs to improve those poor prospects and for designing public policies to protect the community from their criminal predilections.

7. Community Influences. Although some of the earliest sociological research on delinquency and crime, associated with the "Chicago School" of sociologists in the 1920s, paid special heed to the influence of community characteristics and structure on delinquency, that perspective went into decline for many years and is only recently undergoing revival. Yet we know that some communities have much higher crime rates than do others despite similar population composition and levels of poverty. We know that some neighborhoods provide much more attractive opportunities for criminal participation than others. What we don't know, however, is whether community and neighborhood characteristics influence participation in delinquency and crime independently of other social and individual differences, and to what degree. The Program's research design incorporates a variety of individual, social, and community variables and, if implemented, will be the most ambitious effort ever made to understand the interactions among these three kinds of influences.

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These seven sets of issues are merely illustrations of the empirical and public policy issues the Program's research agenda addresses. The agenda's overriding goal is to increase understanding of the developmental pathways leading to participation in delinquency and, ultimately, serious predatory adult crime and, derivatively, to identify promising interventions for disrupting individuals' progressions down those developmental paths.

### B. Summary of Research Agenda

The Program's proposed research plan is simultaneously an interdisciplinary research agenda on the natural history of conduct disorder, delinquency, and criminality from birth to age 25 and a proposal for a comprehensive set of integrated research projects.

1. The Cohort Design. The research agenda envisions a series of interdisciplinary studies of antisocial behavior that integrate biological, behavioral, and sociological perspectives in a way that has never before been attempted. We propose launching in two or more urban areas a set of accelerated longitudinal studies of seven cohorts of subjects, starting prenatally and at ages 3, 6, 9, 12, 15, and 18. Members of the male cohorts will be obtained by household sampling of mothers and their children (who may be unborn). Ideally, each cohort will be followed for eight years and will yield 9 years of data. At the initial interview, subjects will be questioned about the preceding year; for example, the oldest cohort will be first interviewed soon after the 18th birthday and asked about their behavior while aged 17. We envisage that some of the

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youngest cohort would have data collected prenatally from their mothers, who would be first contacted in the second trimester of pregnancy. This design ensures a 5 year overlap in age between each adjacent cohort, and 3 years of data collection before and after any given age (except for the youngest and oldest ages).

The prenatal cohorts would contain 1000 boys and 1000 girls. The other cohorts as now planned would each contain 500 boys, except the 18-year-old cohort which would contain 1000 boys. There may in addition be supplemental samples of male and female siblings, females alone, and especially high crime-risk offenders (such as persons arrested for violent crimes or released from prison).

The major focus on males follows from a concern to obtain within the study population a sufficient number of predatory and violent offenders, and our belief that 500 males in each age group would be the minimum required. For some purposes, adjacent cohorts could be amalgamated, thereby providing 1000, 1500, or 2000 males at a given age. We have proposed larger samples of 1000 males in the birth and age 18 cohorts because amalgamation is not possible at the oldest and youngest ages. We also wish to study the development of 1000 females in the birth cohort, in the hope that these birth cohorts can eventually be followed beyond the initial 8-year project period to advance knowledge about both male and female development over long periods.

Before discussing the research agenda in greater detail, a few paragraphs should be devoted to its character as a series of prospective accelerated longitudinal studies. Longitudinal studies attempt to learn about the experiences of a group of subjects over time. Longitudinal

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studies are often contrasted with cross-sectional studies which examine a group of subjects at one time. A cross-sectional study can be likened to a snapshot that depicts offenders and their attributes and past experiences at a single moment. Like a snapshot, a cross-sectional study can describe things and permit observers to know what is correlated with what, but it cannot reliably tell what precedes what. A longitudinal study, by contrast, can be likened to a videotape which, as it unwinds, can show whether children who fail in school then become delinquents, or whether children first exhibit problem behaviors and then fail in school, or whether some categories of children follow one developmental path and other categories of children follow another.

Long-term longitudinal studies have one serious disadvantage: they take a long time to be carried out. As a result our research agenda features an accelerated longitudinal design in which seven groups of subjects of different ages separated by three year intervals are followed for eight years. Because of the three year interval, at the end of three years the research will generate data roughly equivalent to that gained by a single study of a group of subjects from birth to age 21. This is because the original group of 3-year olds will have been followed to age 6, the 6-year olds to age 9, the 9-year olds to age 12, and so on. Assuming the groups of subjects are comparable except for their starting ages, the resulting data can be combined to yield a single data set covering the period from birth to age 21. The validity of these conclusions, and of the methods of data linkage, can be established by the later follow-up data. If the research is carried out for eight years, the combined data will cover the lifespan from birth to age 25 and the benefits of the accelerated

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longitudinal design will for a variety of reasons be much greater.

An accelerated longitudinal study of this kind has never before been undertaken in research on delinquency or criminality, though in principle there is no reason why it should not be. Leading statistical analysts of longitudinal data sets have been consulted and advise that the plan is indeed path-breaking, exciting, and feasible.

Figure 1 shows a simplified schematic version of the proposed seven-cohort study of male subjects. By showing the number of subjects studied at each age during the course of each cohort study, figure 1 shows the design's key feature that data will be obtained on different cohorts at common ages. At ages 6, 9, and 12, for example, data will be collected on three different cohorts. This has two major advantages. First, for some purposes, data from three cohorts can be aggregated to yield combined samples of 1500 or 2000 subjects. Second, data from different cohorts at the same age can be compared, thereby providing opportunity to disentangle characteristics and behavior that result from the subjects' ages and maturation and those that result from the cultural or social influences of a particular period.

The cohorts also cover critical transition periods in developmental histories, such as preschool, school entry, puberty, school dropout, school completion, entry into employment, transition from juvenile to adult court, marriage, and military service. Older cohorts can be analyzed to predict the experience of younger cohorts. Cross-sectional samples can be drawn from all seven cohorts.

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2. Community Design. At the core of our plan stands a proposal to sample individuals from thirty or more communities, classified according to community characteristics, including crime rates, within a given city. There will be over-sampling in high crime communities. Information will be collected from the cohort members and their families about the communities in which they were living. Changes in communities over time will be monitored as will changes in individuals in order to investigate how patterns of individual development vary with the community context. Individuals will also be followed as they move between communities, to disentangle individual and community influences on crime. This has never been done before in criminology.

As a practical matter, the sampling plan must identify enough conduct-disordered children, delinquents, and adult criminals for study. By selectively choosing persons from neighborhoods with high crime rates, we can increase the chances of locating offenders and of including them in the sample. Our preliminary judgment, based on analyses of existing data sets, is that this strategy should provide a sufficient number of active criminals and other persons with serious behavior problems to permit meaningful statistical analyses. Without more information, however, we can not be certain that our assessment is correct. For this reason, we plan in the next phase to carry out a pilot screening study to gauge the effectiveness of the sampling plan. As part of this project, we will examine the desirability and added benefits of supplementing a community sampling procedure with individual-level risk assessments as a way of increasing the yield of offenders.

From a theoretical perspective, it is critical to learn how individual



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development is influenced by the environment, including features of the neighborhoods and communities in which people reside. A community-level sampling plan assures that our samples will include offenders and non-offenders who come from high- and low-risk areas. Thus, we will be in a position to identify aspects of community organization and structure pertaining to schools, social services, families, and the criminal justice system that can direct persons along desirable and undesirable developmental paths. In connection with this aspect of the design, a series of community surveys will be conducted to collect important neighborhood information that researchers generally ignore.

3. Siblings and Female Subjects. In addition to the seven male cohorts, the Program's research agenda calls for studies of a female birth cohort, and for other possible longitudinal studies of females and siblings. Under current plans, as noted earlier, the birth cohort will include 1,000 males and 1,000 females, and the 12-year-old cohort may be supplemented to contain siblings. The sibling component, while a familiar design feature of behavioral genetic studies, is unprecedented in criminological research and requires substantial elaboration in the Program's next phase. By incorporating pairs of siblings in the sample, we can compare the behaviors and experiences of children in the same family to those of children in other families and thereby identify common and unique aspects of family life that shape childhood development in different directions.

Female deviance and crime is an understudied topic, partly because males are much the predominant perpetrators of serious and predatory crime.

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However, our concern with human development and with interrelationships among a variety of problem behaviors requires that we give serious attention to gender differences in antisocial tendencies. In our research plan, females hold prominent roles in the birth cohort, which will be followed into childhood and possibly longer, and possibly in a sibling cohort, which will straddle adolescence and the transitions to parenting and other adult family roles. We are at present undecided whether more or less attention than is now contemplated should be devoted to female subjects and to gender differences in development. One issue that remains unresolved is the extent to which information collected on females should differ from that on males. In the next phase we will consult with developmental specialists on all of these issues.

4. Drugs and Crime. Proposals to study drug abuse and especially the interactions between drug use and criminality appear throughout this report. For example, the proposed research agenda offers anew an opportunity to explore the issue of whether drug use precedes criminality or vice versa. We know, however, that use of illicit substances is common among criminal offenders. The National Institute of Justice's Drug Use Forecasting program indicates that 40 - 85 percent of felony arrestees in American cities test positive for drug use. Other research consistently shows that active criminal offenders tend to be active drug users and that periods of high-rate criminality tend also to be periods of high-rate drug ingestion among drug-using offenders. Measures of drug use will be used throughout the cohort studies on various samples ranging from the mothers of members of the birth cohort to the members of the cohorts and their

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peers. During Phase III, a comprehensive strategy will be devised for learning more about the relations among drug use, antisocial behavior, and criminality.

5. The Longitudinal-Experimental Combination. Where feasible, experimental interventions will be included in the longitudinal studies to investigate the effectiveness of methods of interrupting the course of development of offending and antisocial behavior. To some extent, longitudinal and experimental studies have complementary strengths and weaknesses. Longitudinal studies are especially useful in advancing knowledge about the natural history of criminal careers, while experiments are especially useful in investigating the impact of specific events on the course of development. Past longitudinal studies tend to have given insufficient attention to such questions. Also, experiments can typically examine the influence of only one or two independent variables, while longitudinal projects can study literally thousands of variables, but with lower internal validity. It is more economical to carry out both longitudinal and experimental studies with the same individuals than with different individuals, providing that the two studies do not seriously interfere with each other. In order to permit the linkage of the initial 3 years of follow-up data with no possible interference, and to build up a picture of development from birth to age 21, we envision no intervention experiments until after 3 years of initial data collection.

We plan at least yearly data collection directly from the subjects themselves, from other informants such as mothers and teachers, and from a variety of institutional records (schools, juvenile courts, police). Other

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measures will be employed less frequently or only at pertinent ages.

No criminological experiment has ever had several years of face-to-face data collected both before and after an intervention. However, there are a number of reasons why experiments would be strengthened by such longitudinal data collection. The impact of interventions can be better understood in the context of preexisting trends or developmental sequences. Prior longitudinal data can establish baseline measures, to verify the equivalence of people in different experimental conditions, to study the interactions between types of people and types of treatments, and to estimate the impact of attrition from the different experimental conditions. Subsequent longitudinal data can be used to assess the impact of the intervention in changing people and to investigate both short-term and long-term effects. It is difficult to estimate in advance the likely time delay between causes and effects or the likely persistence of the effects of interventions; these can be investigated in the follow-up data.

6. The Cohorts. Little existing research relates factors measured prenatally, soon after birth, or in early childhood, to later criminal careers. In the birth and early childhood cohorts (ages 3 and 6), our main aim is to study the development of conduct disorder. Individual factors such as impulsivity and intelligence will be measured, together with peer interactions, family experiences, school achievement, and physical health and growth. Biological measures will include birth weight, resting pulse rate, and testosterone levels in saliva. The focus will be on risk factors for conduct disorder, on critical periods in development, and on the effect

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of life transitions, for example from home to preschool to school.

One important theory for this age range suggests that there are temperamental predispositions (characterized by impulsivity, boredom, low empathy, and irritability) which are apparent in the first year of life and predict later conduct disorder. Attachment theory emphasizes the significance of the mother-child relationship in the first 3 years of life, identifying an insecure avoidant relationship as a precursor of conduct disorder. Social learning theory suggests that harsh or inconsistent parenting practices produce conduct disorder. One most important intervention for testing at these ages is a preschool program including good health care and nutrition, parent training in child-rearing methods, intellectual stimulation, and social skills training in peer interaction, impulsivity, and low empathy.

In the early adolescent cohorts (ages 9 and 12), the main focus will be on the onset of offending, on factors influencing onset, on links between onsets of different kinds of acts, and on the implications of onset features for the development of the later criminal career. The aim is to identify developmental sequences that begin with conduct disorder or minor offending and escalate into more serious crime, and to identify manipulable factors that are present before the stabilization of antisocial behavior. Numerous criminological theories apply to the teenage years, but they usually aim to explain differences between offenders and nonoffenders rather than to predict the developmental course of offending. Individual factors such as impulsivity and intelligence will be measured, together with biological factors such as the onset of puberty, family factors, peer relationships, school achievement, drug use, interactions with the juvenile

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justice system, and employment. One possible experimental intervention would be to train adolescents to resist deviant peer influences.

The older cohorts (ages 15 and 18) will focus on persistence in or desistance from criminal careers, and on the development of frequent or serious offenders. Attempts will be made to investigate the effects of the transition from school to work, of settling down with a wife or cohabitee, of alcohol and drug use, and of the transition from juvenile to criminal justice sanctions. There will be a special focus on social control or bonding to school, marriage, and work, on the development and persistence of peer networks and co-offending, and on links between offending and community disorganization.

7. Costs. Although cost estimates for various components of the proposed research agenda have been developed during Phases I and II of the Program's work, detailed estimates cannot be prepared until Phase III of the Program is underway. To this point, preparation of detailed cost estimates has been premature. As development of measures and instruments proceeds, hard choices must be made between cost effectiveness and scientific importance. Use of some biological measures or of participant observation methods, for example, can be exceedingly expensive. Their importance for realizing the benefits of the research design may require that they be used, but until final decisions are made about the precise measures and methods to be employed, and for what samples or subsamples, it is impossible to estimate the costs that will be involved. At a more mundane level, decisions must be made about the frequency of measures: semiannual interviews with subjects will, for example, inevitably cost

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substantially more than will annual interviews. As these and other decisions are made, their cost implications will become clear and detailed costing estimates can be made.

### III. THE FUTURE

Both the challenges and the likely benefits of the proposed program of research are great. Earlier in this report, the origins of the Program, its first two phases, and its research agenda are described. Phases III and IV are the business of the coming years and respectively encompass the development of detailed plans and protocols and the execution in the field of the research design.

#### A. Phase III - The Intermediate Period

There are eight major objectives to be accomplished in Phase III. First, pilot studies of a number of measures including biomedical measures and alternate measures of temperament will be conducted to determine whether they will meet the needs of the research. Second, a series of instrument development activities will be completed, including screening existing research instruments and assessing their suitability for the purposes of this project, and development and testing of new instruments. Third, a series of methodological projects will be launched concerning such things as reducing attrition of sample subjects; identifying, tracing, and eliciting cooperation from fathers of research subjects; the comparative reliability of offenders' self-reports and official records; reliability and cooperation problems associated with frequency of measurements; and other properties of alternative data collection methods. Fourth, to obtain

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the necessary samples of subjects, it may be necessary to screen 75,000 - 100,000 households; a pilot study needs to be undertaken to screen a limited number of households in an eligible research site to determine whether the "yield" of subjects at high risk of conduct disorder, delinquency, and crime, depending on their ages, can be realized from a single household screening, or whether subsequent screenings of individuals will be required. Fifth, the standards and processes for selecting research sites and teams must be completed, the processes for those selections must be carried out, and the research teams must start work. Sixth, a variety of organizational and administrative decisions must be made concerning the establishment of protocols and procedures for assuring standardization of instruments and measures, quality control of the execution of the research plan, cooperation with rules on data sharing and archiving, compliance with human subjects rules and regulations, and analysis and dissemination of the findings. Seventh, alternative data analytic methods for analysis of longitudinal data must be surveyed and a data analysis plan developed in time for its elements to be incorporated in development of instruments and measures. Eighth, plans for standardization, delivery, analysis, and archiving of data generated by the entire complex of projects must be completed and arrangements made for the personnel and mechanics to oversee and to carry out those responsibilities.

### B. Phase IV. - Fieldwork

The fieldwork will be carried out. The mechanisms and processes established during Phase III for assuring quality control, coordinating ongoing projects, assuring compliance with rules on standardization of



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instruments and measures, data access and sharing, and human subjects will be carried out. Finally, analysis of the data and dissemination of the findings will be undertaken at various intervals, as expeditiously as possible, throughout Phase IV.

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The various chapters of this report identify tasks to be accomplished and issues to be addressed. The Program on Human Development and Criminal Behavior's research agenda is an ambitious set of closely-linked proposals because this is what is needed to address the complex of influences that generate criminal careers and deviant behavior. The job ahead is to do what has not yet been done: to launch research enterprises of sufficient scope, intensity, and duration to create a new understanding of the processes leading to conduct disorder, delinquency, and criminality, and to develop improved public policies for their prevention and control. This report outlines the research strategies that the Program deems essential to accomplish that end.

AGE	AGES OF COHORTS AT TIME OF SAMPLING							TOTAL SUBJECTS BY AGE
	Pre- natal	3	6	9	12	15	18	
Pre- natal	(1000) *							1000
0	1000							1000
1	1000							1000
2	1000	(500)						1500
3	1000	500						1500
4	1000	500						1500
5	1000	500	(500)					2000
6	1000	500	500					2000
7	1000	500	500					2000
8		500	500	(500)				1500
9		500	500	500				1500
10		500	500	500				1500
11			500	500	(500)			1500
12			500	500	500	**		1500
13			500	500	500			1500
14				500	500	(500)		1500
15				500	500	500		1500
16				500	500	500		1500
17					500	500	(1000)	2000
18					500	500	1000	2000
19					500	500	1000	2000
20						500	1000	1500
21						500	1000	1500
22						500	1000	1500
23							1000	1000
24							1000	1000
25							1000	1000

Fig. 1 Numbers of Male Subjects at Each Age, Prenatal to 25 Years.

Note: Data on samples shown in parenthesis will be obtained retrospectively at a first interview on or after the subjects' following birthdays.

\* There will in addition be 1000 female subjects in the birth cohort.

\*\* Male and female sibling samples may augment the 12-year-old cohort.