

I. DESCRIPTION OF THE PROPOSED TRAINING GRANT

Northwestern University requests support for a five-year program of pre-doctoral interdisciplinary research training in the education sciences from the Institute of Education Sciences (NCER-04-06). Our goal is to develop and implement a program that will equip a cadre of scholars to conduct theoretically grounded, methodologically rigorous education-related research.

I. A. Challenges for education research

The troubled state of education research makes this a challenging task, for several reasons. First, few education research studies involve randomized experiments or strong quasi-experimental methods (Cook, 2001). As a result, causal inferences are difficult to make based on existing research. Second, much of the current education research lacks a strong disciplinary grounding or interdisciplinary framing. Hence, the systematic accumulation of empirical knowledge about education and its improvement has been difficult; the proverbial wheel is reinvented again and again. Third, education researchers in various disciplines do not communicate well with one another and with education practitioners and policy makers. In academic settings, the pervasive lack of communication is reflected in the existence of separate departments and separate journals for educational psychology, educational administration, curriculum and instruction, mathematics education, teaching and teacher education. Much research on the economics and sociology of education is conducted within these respective departments and published in disciplinary journals.

We believe that research on learning and development must draw insights regarding cognition and learning from psychology, context from sociology, and behavioral modeling and policy analysis from economics; it should mix qualitative, quantitative, observational and even biological approaches to measurement and analysis; and it should be directed at informing public policies that might affect schooling in particular and child well-being in general. Our graduate program is designed to address these three challenges by educating a cadre of scholars who understand each others' "language" and share a common understanding of rigorous research methods.

Some see the solution to these challenges in nesting education research exclusively in the disciplines – psychology, economics, and sociology. Although we agree that disciplinary preparation is essential, we believe that situating education research exclusively in the disciplines will generate a different set of problems. While many scholars in these departments pursue research on learning and development, many do not focus on how children learn in schools. Consequently, empirically rigorous basic research on learning and development, particularly in educational contexts, often never makes it beyond the pages of scholarly journals.

We do not believe that this problem can be solved simply by more effective dissemination of basic research. Instead, translating basic research on topics such as student learning of mathematics or how teachers learn about teaching mathematics into usable knowledge for school systems and classrooms involves complex development and applied research work. Scholars in Northwestern's Learning Sciences program have taken findings from basic research and, through design research in classrooms, have turned them into education programs. Only recently, however, have these faculty considered taking the next step of evaluating the effectiveness of these programs through randomized trials. Finally, there is the dual challenge of going to scale with particular interventions that have been shown to be effective in schools and classrooms and then evaluating these larger endeavors.

I. B. Meeting the challenge

We propose an approach to producing the next generation of researchers on education that will bring together successive cohorts of Northwestern University graduate students in psychology, sociology, economics, Human Development and Social Policy (HDSP), the Learning Sciences (LS).

The *primary goal* of our training proposal is to provide a unified program of coursework and research mentoring. We want graduates of the training program to conduct educational research

with knowledge of the highest standards of inquiry and scientific practice, to view the educational enterprise through a truly interdisciplinary lens, and to be mindful of the need to learn new research skills and theoretical approaches throughout their careers. Our ultimate goal is to instill an approach to learning rather than a specific set of research skills or theoretical perspectives.

Nevertheless, specific skills have to be acquired, and this proposal places slightly more weight on skills in educational evaluation than in formal statistics, policy or learning and cognition. However, these areas are all interconnected. Summative evaluations nearly always require sophisticated statistics. Evaluations reflect policy needs and contribute to modifying policy frameworks. Unless evaluations explore how children learn, they will never penetrate the “black box” and help generate explanatory knowledge.

A pressing need in American education is to improve how reforms are evaluated, since past practices in educational evaluation have not helped policy makers and parents to identify what works, and there is surely an urgent need to know what works (Cook, 2003). So we particularly emphasize rigorous training in educational evaluation, aspiring to bring this field up to or above the levels currently found in medicine, public health and social policy, while simultaneously respecting what is unique about education. Only evaluation training that is rigorous in theory and method as well as consciously self-critical can produce graduates who think for themselves, who are not trapped by the skills they know, and who can improve the yield from educational research by doing first-rate studies in their later work in universities, contract research firms or school districts.

For sociology graduate students with a focus on qualitative methods, for example, this means research experience on a mixed-method evaluation of a random-assignment curriculum intervention, sufficient understanding of quantitative methods to critique the non-experimental quantitative literature on curriculum reform, and an adequate understanding of policy to prioritize the cost-effectiveness of the given intervention relative to competing alternative policies. For an economics graduate student estimating education “production functions,” it means understanding enough about child learning and development to appreciate the very different educational needs of disadvantaged second graders, middle schoolers and eleventh graders. It also means mastering qualitative methods sufficiently to learn from its school-based literature, and to be able to distinguish good from bad qualitative research.

For a learning sciences or psychology graduate student focused on mathematics understanding, it means an ability to conduct or collaborate with others conducting rigorous evaluations of a curriculum intervention built around key new insights regarding mathematics understanding, as well as truly thoughtful policy discussions of their research findings. For a human development and social policy student whose curriculum already has an interdisciplinary orientation, it means a solid grounding in education-focused theory and empirical work in at least one of the core training grant disciplines and an ability to understand and judge research in the other two.

For all of the graduate fellows, it means instilling a knowledge and appreciation of related work in all of the core disciplines, and increasing the odds of an interdisciplinary research career. Above all, it means developing an ability to synthesize insights from a variety of disciplines in one’s thinking and research, and engaging in a career of education-related research that is far different from, and more productive than, the kind of disciplinary career that would have been pursued in the absence of training grant activities.

A *second goal* of our training proposal is to create education-focused faculty research collaborations that would not have happened in the absence of the grant support. Our proposal builds in a variety of mechanisms (steering committee meetings, research seminars, workshops and opportunities to employ grant-funded graduate students on research projects) that will bring diverse faculty with education-focused interests together to talk about topics that each has approached in different ways.

These goals will be met by a distinguished faculty already engaged in highly relevant teaching and research. For example, in *methods and program evaluation*, core faculty member Thomas

Cook literally (co)wrote the book on causal research in field settings; he has taught generations of graduate students in these methods and engaged a number of graduate students in random-assignment evaluations such as that of Comer Schools. Core faculty member Greg Duncan and his graduate students, in collaboration with MDRC, have conducted several follow-up evaluations of child achievement impacts of the random-assignment Milwaukee New Hope program and, also in conjunction with MDRC, has engaged in meta-analyses of child achievement impacts from seven welfare-to-work experiments. Core faculty member Bruce Spencer has advised on the design and analysis of TIMSS and NAEP and taught generations of graduate students the fundamentals of sample survey analysis.

In *learning, cognition and child development*, deputy director Lindsay Chase-Lansdale has pioneered the application of developmental theory and measurement in large-scale policy studies, and her forte is demonstrating why groups of children at risk manage to succeed in the transition to school and in later cognitive achievement. Core faculty member Sandra Waxman's research has centered on the acquisition of concepts, word meaning and reasoning during infancy and early childhood. Core faculty member David Uttal has studied the development of children's conceptions of educational symbols, including letters, numbers and maps.

In *policy*, core faculty member Christopher Taber has studied the effectiveness of Catholic schools, the impact of vouchers and whether borrowing constraints limit college enrollment, while core faculty member James Rosenbaum, incoming head of the Sociology of Education division of the American Sociological Association, is widely recognized for his ambitious research program on the high school-to-work transition and the role of community colleges.

In *program development and implementation*, core faculty member Danny Edelson has developed and used design experiments to study the implementation of science curricula for middle and high school science. Program director James Spillane has studied the implementation of state and national policies designed to influence the teaching of mathematics, science and reading in local school districts and schools. A more complete description of ongoing research projects of core and affiliated faculty can be found in Section III of the proposal.

Northwestern's considerable successes with policy-focused interdisciplinary graduate training programs are spelled out in the next section (I. C.). As detailed in section I. D., training activities include a required core set of statistics, education evaluation, learning and cognition, and policy and implementation courses, a host of elective courses in these areas, and participation in biweekly research seminars and fellows' meetings.

The longstanding interdisciplinary tradition of Northwestern has led to a number of "translation" courses that enable students to cross disciplinary boundaries. For example, Duncan has long taught a microeconomic policy course that teaches non-economist students how economists think about behavior modeling, cost/benefit analysis and policy. This course has served as a bridge to an advanced public economics course offered by the economics department that is designed to be accessible to non-economics students. Ortony and Peterson teach a course on links between cognitive science research and research on learning in everyday situations, including classrooms. This course serves as a bridge between the learning sciences and psychology. More generally, our curriculum provides a set of both existing and new "translation" courses that serve as bridges to the disciplinary research currently being conducted within sociology, psychology and economics. A key goal of these courses and of the seminars and research mentorships is for students to be able to understand and judge critically research produced in other disciplines and to use a variety of research methods.

Our plan for project direction is outlined in the Section II of the proposal and includes a director and deputy director in each of the project years as well as a steering committee consisting of core faculty members. The likely quality of graduate student applicants is documented in Section II. B., followed by a description of our plans to ensure substantial numbers of minority students. Key personnel for the projects are described in Section III. The extensive resources provided by Northwestern University are described in Section IV.

I. C. Recent interdisciplinary training grants at Northwestern University

Northwestern has a long tradition of interdisciplinary research collaboration and graduate training. Both of the applied graduate programs in human development and social policy and learning sciences are firmly grounded in the disciplines with faculty developing frequent collaborations with faculty in sociology, economics, and psychology and computer science. Interdisciplinary research collaborations on policy topics have long been supported and enhanced by Northwestern's Institute for Policy Research.

Northwestern University has also enjoyed considerable success in running three large interdisciplinary social science training programs: a 1990-1995 National Science Foundation funded program in urban poverty, race, and social policy; Northwestern's 1996-2003 HHS/ASPE funded Joint Center for Poverty Research (JCPR); and the 1998-2005 Spencer Research Training Program. These training programs share many similarities with the one proposed here. They have provided interdisciplinary, multi-method, policy-oriented coursework and mentoring for more than 80 Northwestern University graduate students, many of whom have gone on to research and teaching positions in prestigious university and policy research settings. While the focus of these past training programs has been on understanding the causes and effects of poverty, the proposed training grant would help focus faculty training and research efforts on education. Appendix Table C.1 summarizes student participation and accomplishments in the recent JCPR and Spencer training programs.

Joint Center for Poverty Research training. Between 1996 and 2003, JCPR has supported and nearly 90 advanced doctoral students, 43 of whom attended Northwestern University, while the remainder attended the University of Chicago. Northwestern graduate students were drawn primarily from economics, sociology, and HDSP. Core faculty member Greg Duncan directed JCPR between 2000 and 2003 and served as deputy director between 1997 and 2000.

Housed in the Institute for Policy Research, a key activity of JCPR was to train graduate students in interdisciplinary thinking and state-of-the-art analysis and research skills to conduct poverty-related policy research. The careers launched by those fellowships are given in Appendix Table C.1 and include placements in the Sanford Institute of Public Policy at Duke University, the Department of Policy Analysis and Management at Cornell University, the School of Social Work at the University of Washington, the sociology department at Johns Hopkins University, and the economics and social work programs at the University of Wisconsin-Madison. Others have taken jobs at nonacademic institutions such as the Board of Governors of the Federal Reserve, Mathematica Policy Research, RAND, and Abt Associates. As with our proposed training program, JCPR graduate fellows were required to take core courses and mentored on faculty research projects, and they attended a monthly JCPR seminar as well as a weekly graduate fellows' meeting. Fellows were also able to attend the 14 national conferences hosted by JCPR during its six-year history.

Spencer Foundation training grant. In 1998 Northwestern was awarded a training grant by the Spencer Foundation to train students for research careers in the area of "Improving the Life Chances of Children in Poverty." The research training grant is a collaborative effort in cross-disciplinary research by the HDSP and LS doctoral programs in the School of Education and Social Policy. In order to provide more integrative research training, better suited to the complexity of the substantive issue, a variety of cross-program training mechanisms were implemented. In terms of coursework, Spencer training students take a proseminar, co-taught by two faculty, one from each doctoral program, which integrates a study of concepts and methods and leads to a research proposal (which has frequently proved to be a draft of the eventual dissertation proposal). Students take two additional courses outside their home program. In addition to formal coursework, each Spencer fellow serves a research apprenticeship with a faculty member outside of his or her home program in order to gain more intensive training in complementary methodologies.

A total of 26 students have been awarded Spencer fellowships (including 10 current fellows). Spencer fellows have had an excellent track record of placement in top-tier universities. Fellows have obtained tenure-track positions in schools/colleges of education at the

University of Pennsylvania, University of Virginia, and University of Missouri, as well as a position in social welfare at the University of Washington.

Student trajectories. Because tabular data cannot adequately convey the unique qualities of students attracted to Northwestern's graduate programs, the nature of their training and their job market experiences, we highlight here the backgrounds, training and early career accomplishments of three students, beginning with two, William Corrin and John Diamond, who have been involved with the Minority Student Achievement Network and continuing with a student who graduated from Northwestern's psychology program. Corrin and Diamond are African-American. All are the products of past interdisciplinary graduate training programs and preview the kinds of students who would be attracted to and trained by the proposed IES program.

William Corrin, Sociology

After earning his undergraduate degree from Brown University, William Corrin taught at an alternative public high school for "at-risk" youth in Charlotte, NC, before arriving at Northwestern. He expects to earn his Ph.D. by August 2004, and has accepted a position starting in September 2004 as a research analyst with the Education, Children, and Families group at MDRC.

Corrin has been involved with Evanston and Chicago schools and youth service agencies throughout his graduate career. During his first and second years as a graduate student in the Sociology Department at Northwestern University, he completed a study of the social and recreational needs of young people in Evanston, IL with two other sociology graduate students and core faculty member Thomas Cook. Using data from this project, Corrin and Cook have co-authored a paper about multiracial adolescents (under journal review). With the help of Professor Charles Payne he developed an undergraduate internship course in the African American Studies Department, which he taught for three years. The course coupled an on-campus seminar focused on urban education and school reform with an off-campus practicum, in which the undergraduates spent several hours each week in a K-8 Chicago public school assisting in classrooms and/or tutoring and mentoring 6th-8th grade students. Corrin also taught courses about race and urban education as a lecturer with the African American Studies Department.

Corrin became the Evanston Township High School District's Director of Research, Evaluation, and Assessment; and, in this role, coordinated internal and external research and evaluation projects, oversaw the student testing programs, and helped school personnel become more active users of empirical data in the service of their practice. During this time he also joined the Board of Directors of a local youth service agency that runs after-school and weekend programs in collaboration with the Evanston public schools. Corrin left his district administrator's position to return his focus to his dissertation work, which involves studying the school experiences of mixed-race 7th-11th graders, using survey data from over 30,000 students collected by the national Minority Student Achievement Network (MSAN), of which the Evanston school districts are members. Corrin also served as a research assistant for MSAN, producing a report for NCREL (publication pending) about an adolescent literacy intervention.

John Diamond, Sociology

After graduating from the University of Michigan, John Diamond earned his Ph.D. from the Sociology Department at Northwestern University. He was an NSF Race, Poverty, and Urban Inequality fellow for three years. As a graduate student and NSF research fellow, Diamond collaborated with Charles Payne and Thomas Cook on their random-assignment evaluation of the Comer School Development Program. Payne and Diamond published their work in a volume on school leadership in comprehensive school reform. Diamond wrote a dissertation on parent involvement in education, under the supervision of Phillip Bowman (HDSP), Thomas Cook, Aldon Morris, and Charles Payne. Work from this dissertation was subsequently published in

The Berkeley Journal of Sociology and Education and Urban Society and presented at meetings of the American Sociological Association, the Association of Black Sociologists, and the Society for the Study of Social Problems.

Following graduate school, Diamond joined project director James Spillane (HDSP/LS) as a postdoctoral fellow working on the Distributed Leadership Study, a longitudinal study of elementary school leadership in mathematics, literacy, and science. Diamond later became the study's research director and a research assistant professor. He has published eight papers from this research in various journals, including *Sociology of Education, Anthropology and Education Quarterly, Teachers College Record, Educational Researcher, Educational Policy, The Journal of Curriculum Studies* and *The Journal of Research in Science Teaching*.

Since completing the PhD, Diamond has received over \$200,000 in research awards, including grants from the National Academy of Education/Spencer Foundation postdoctoral fellowships program, the National Science Foundation, and the North Central Regional Educational Laboratory. Diamond has accepted a faculty position at the Harvard Graduate School of Education.

Laura L. Namy, Psychology

After graduating from Indiana University, Laura Namy earned an M.S. (1994) and Ph.D. (1998) from Northwestern University's Cognitive Psychology program in the Department of Psychology. As a graduate student, Namy collaborated with core faculty member Sandra Waxman and affiliated member Dedre Gentner on a variety of projects investigating early child development and the role of experience and input in children's language acquisition. This work has been published in a variety of child research journals, including *Child Development, Developmental Psychology, Journal of Cognition and Development, and Journal of Experimental Psychology: General*. As a graduate student, Namy also worked with Dedre Gentner on a series of studies exploring the role of comparison-based instructional practices in optimizing learning, which have been published in *Cognitive Development, Journal of Experimental Psychology: General*, and a recently published edited volume. Her work has important implications for structuring instructional strategies in both formal and informal educational settings to draw upon children's maximum learning potential.

During her final year in graduate school, Namy applied for an NIH National Research Service Award Post-Doctoral Grant as well as a small number of faculty positions. Namy's post-doctoral award was granted, while her applications to faculty positions yielded offers from a number of psychology departments, including those at Emory University and Johns Hopkins. Namy opted to join the faculty at Emory, in large part because it shared a dual emphasis on teaching and research. She joined the faculty at Emory in 1998 and received early tenure in 2003. Her research continues to explore the cognitive underpinnings of children's early capacity for learning and the types of learning environments that optimize the learning potential, particularly within the domains of language acquisition and categorization. She has been active in her university and the psychology community in promoting the use of interactive web-based technology as a technique for exposing students to behavioral science research. Namy is currently director of Emory's joint major in psychology and linguistics, which she designed and established in 1999.

I. D. Proposed training

Number, recruitment, and selection of trainees. We propose to train 22 graduate student fellows over the course of the training program's five years. During the program's initial year we would recruit four students into the program. Six students would enter in each of the program's second through fourth years, with the expectation that many of the training activities would continue beyond the grant's five-year period. Students would typically enter the program at the beginning of their second year of graduate study and engage in training and mentoring activities in their second through fourth years of graduate training.

To become a trainee, a student must be nominated by a member of the core or affiliated faculty. Faculty would look for students who show particular promise for and interest in methodologically rigorous and theoretically-motivated educational research. Working with a faculty mentor, the student must prepare a brief proposal describing how the student's own interests and proposed graduate training reflect his or her long-term interest in the goals of the training program and how the sponsoring faculty member's involvement as a research mentor would help accomplish these goals. The steering committee will select the incoming class of fellows in February prior to the summer in which their fellowships would start.

Based on experience with our past training grants and the likely demand for the education-focused training, we expect that about five of the 22 slots would be awarded to psychology students; six or seven of the slots would go to sociology; four or five would be awarded to HDSP and to LS students; and two or three would be awarded to economics students. Of course, we will impose no fixed quotas on this process, and will make an effort to compose a disciplinarily diverse group each year.

Graduate student fellows are expected to participate fully in training grant activities, including preparing for, attending and, occasionally, developing presentations for the program's biweekly seminars. They will also be expected to meet with outside speakers, sometimes for lunch or dinner. Fellows' doctoral dissertations will address practical questions in education. Dissertation committees will include two core or affiliate faculty members who are part of the interdisciplinary training program.

Required and optional courses. Appendix Table C.4 lists required and optional courses grouped into the broad categories of statistics, evaluation, cognition/learning and policy. The four required statistics classes include basic statistics courses already required in participating programs, as well as Hierarchical Linear Modeling, which is widely used in education-related research.

The evaluation course requirements are most extensive and cover Tom Cook's course on causal inference in field settings, qualitative methods that are useful in formative stages of evaluations and psychometric theory.

The three required courses in learning and cognition span basic cognitive development, learning in context, and a more general overview of child development. The three required policy courses introduce students to how economists and sociologists approach education policy topics and include a course focused specifically on how different education policies influence schools and classroom learning in mathematics, reading, and science.

Typical course sequences for students in the various graduate programs. Course requirements will be implemented in a variety of ways across the sociology, psychology, economics, HDSP and LS programs.

Sociology. One of the three broad areas in which the sociology department has made commitments to research and teaching is inequality, labor markets, race and gender. As with past training grants, students from this area are most likely to become education-focused trainees. An unusual feature of the department is that most sociology faculty are jointly appointed in the sociology department and an interdisciplinary research center such as the Institute for Policy Research. These links foster innovative research across disciplinary lines. Thus, students often develop cross-disciplinary research interests and methodological skills.

A series of core courses provides students with a solid foundation in sociological theory and the logic of social inquiry. An unusual feature of the department is its commitment to train every student in both qualitative and quantitative research methods. Students also typically take several courses in other departments as part of their training. The likely curriculum for Sociology students who become trainees would begin in the summer between their first and second years with research projects involving faculty mentors supported by training grant funding, and continue with this arrangement through the second year. The trainees would attend the training seminar series in their second, third, and fourth years, and concentrate on finishing their dissertations and finding jobs in their fifth years.

Psychology. The graduate programs in Northwestern's Department of Psychology aim to train scholars and researchers who will become future leaders of scientific psychology. It is composed of several major divisions; the most relevant for the training grant include the social, clinical and cognitive divisions. Course requirements differ across programs. All Ph.D. students take department-wide courses, as well as more specialized courses focused on their specific areas of interest. All students also take research-related courses and seminars and engage throughout their graduate years in a series of research projects. The philosophy of the department is to provide core training in psychology, while tailoring courses and seminars to the individual interests of students within the divisions. As a result, there is considerable latitude in courses, which makes it relatively easy to accommodate the training program's requirements.

The first year of graduate training is filled with required methods and content classes. At the end of the summer, a major first-year research paper is due. Trainees would then begin, in the fall of their second year, with research projects with faculty mentors supported by training grant funding. The training-grant-supported research mentoring would continue through their fourth years, during which time the trainees would attend the training seminars and participate in other fellow activities. They would concentrate on finishing their dissertations and finding jobs in their fifth years.

Economics. Over the course of the past decade, an average of one entering student per year or every other year eventually developed the kind of education-focused interests that would be facilitated by a traineeship. In the past, these students became fellows in the NSF or JCPR training program; the current grant continues in this tradition. The training sequence for economics students differs slightly from that of other programs because the economics program requires many more courses than the other programs. The first year of the economics program focuses on core issues in economics and tool-building, and students are not exposed to empirical work in economics until the second year. Thus they are not prepared to decide whether to enter the program until the end of their second year. Our experience is that the strong methodological and policy training would enable them to understand and engage in most of the seminar discussions. Consequently, training grant and seminar activities are pushed back one year relative to the other programs, with research training support beginning in the summer between the second and third years and extending through the end of the fifth academic year. The economics department has a remarkably strong collection of microeconometricians, and a typical economics student in this program would take a total of seven econometrics classes (three in the first year, three for the econometrics field, and one applied econometrics class). As a result, economics students would not take the required statistics classes. Economics students would take the bulk of the required classes in their third year.

Human Development and Social Policy. Through coursework and research experience, students in the HDSP Ph.D. program are expected to master quantitative or qualitative methodologies employed in developmental and policy research. On the conceptual side, students acquire a strong working knowledge of research on child and youth development, including parenting, peer relations, and contextual effects. The program provides research mentorship that includes both qualitative and quantitative projects. The philosophy of the program is to provide core training in development, methods and policy, with courses chosen to fit the individual interests of students. As a result, there is considerable latitude in courses, which makes it relatively easy to accommodate the training program's requirements.

HDSP students' first years are filled with required methods, development, and policy classes. Trainees would begin in the summer between their first and second years with research projects with faculty mentors supported by training grant funding. The training-grant-supported research mentoring would continue through the fourth year. The trainees would attend the training seminar series in their second, third, and fourth years, and concentrate on finishing their dissertations and finding jobs in their fifth years.

Learning Sciences. Drawing from cognitive science, education and computer science research and theory, the learning sciences program prepares students to carry out interdisciplinary research and development work in learning and cognition. Through course

work and research apprenticeships, students are exposed to the three major themes that permeate research and theory in the learning sciences: social context, cognition and design. Coursework on social context examines the social, organizational and cultural dynamics of learning and teaching situations, including classrooms, schools, school districts, museums, corporations and homes. Coursework on cognition focuses on constructing scientific models of the structures and processes of learning and teaching by which organized knowledge, skills and understanding are acquired. Courses on design focus on building environments for learning and teaching, incorporating multimedia, artificial intelligence, computer networks and innovative curriculum and classroom activity structures. In addition, students are required to take coursework in quantitative and qualitative methodologies for the study of learning.

During the first two years, students fill core course requirements in cognition, social context, design and research methods, while participating in a research apprenticeship leading to a second-year research presentation. While the coursework in the first two years of the LS program is intensive, five of the required courses overlap with required courses for the proposed training program. Trainees would begin in the summer between their first and second years with research projects with faculty mentors supported by training grant funding. The training-grant-supported research mentoring would continue through the fourth year. The trainees would attend the training seminar series in their second, third, and fourth years, and concentrate on finishing their dissertations and finding jobs in their fifth years.

Seminars. One of the most important roles of the training grant is to provide a stimulating intellectual center for faculty and students interested in education-related research issues. To help accomplish this goal, we plan to hold a biweekly seminar that provides trainees and core and affiliated faculty a chance to hear outside speakers and critique faculty and, on occasion, trainee research. An every-other-week schedule translates into five meetings per quarter. Two of the five quarterly meetings will consist of a seminar by a prominent researcher outside Northwestern University. Two will consist of research presentations by core and affiliate faculty at Northwestern University or by nearby faculty at the University of Chicago. One will consist of job-talk or conference presentations by trainees. In the off weeks, the program director will meet with fellows on a variety of topics. This was done with the JCPR fellows and these meetings included fellow conference presentations and group mock reviews of paper submitted to sessions in professional meetings for which faculty had responsibility.

Trainees will also be expected to attend at least one departmental seminar per quarter in each of the departments participating in the training activities. Departmental seminars are effective ways for trainees to observe and, in some cases, absorb the very different assumptions, modes of analysis and faculty modes of interaction during seminars. Department coordinators will be responsible for identifying suitable seminars and notifying trainees accordingly.

Workshops. We anticipate that trainees will work with core and affiliated faculty to develop periodic workshops on topics that are of interest to them and fulfill the purposes of the grant. Examples include: i) a one-day tutorial on optimal random-assignment strategies when whole units (i.e., schools) need to be assigned to treatment or controls; ii) a tutorial on using logs to measure school leadership practice and mathematics teaching practice in classrooms, taught by program director Spillane; iii) a tutorial on cluster-analysis and other person-centered quantitative techniques, taught by faculty affiliate Mandara; iv) biomarker methods for measuring stress in children and adults, co-taught by affiliate Adam; v) a tutorial on using social network questionnaires to examine changes in knowledge dissemination in schools taught by program director Spillane.

Conferences. We propose to host two national conferences, one in the third and one in the fifth years of the training grant. In addition to inviting faculty and students from other IES Training Grant programs, we would make these conferences available to the field. Our first conference would focus on designing more rigorous investigations of impacts of curricular programs in mathematics, science or reading on student learning, especially for poor students and students of color. This conference would focus on four key aspects of this issue: a) at what point is evidence on program maturity and effectiveness sufficient to warrant a random-

assignment trial; b) how can one rigorously study the fidelity of program implementation in classrooms; c) evaluation designs for generating robust causal inferences; and d) how does one design evaluation studies that generate robust empirical evidence on the minority and social class achievement gaps. Ideas for the second conference would be developed in the third and fourth years of the grant.

Research apprenticeships. We expect that most trainees will begin to receive research mentoring by a core or affiliated faculty member at the beginning of the summer prior to their second year of study, and that research mentoring will continue through their second through fourth years. The training grant will typically support these activities, although in some cases faculty research grants will support certain aspects of the training. We would expect that the bulk of the trainees' first year of research activities would consist of basic data collection, coding and analysis activities, virtually all of which would be directed by the faculty member. Over the course of the remaining two years, the trainee would be expected to take an increasingly independent, collaborative role, and the research would be expected to lead to conference presentations and coauthored (or, in some cases, sole-authored) publications.

Research mentoring is fundamental to the success of the training grant. It is through research projects that graduate students learn the arduousness of high-quality research and how to critique the research of others. In general, we will follow the successful formula established with our JCPR training grant: It is expected that trainees will work between 12 and 20 hours per week during the academic-year portion of their traineeships—as few as 12 hours when students are still taking full course loads, and as many as 20 when their coursework is largely completed and they are not facing comprehensive examinations or dissertation proposal deadlines. Student trainees will work between 30 and 40 hours per week during the summer months, depending on competing time demands.

As described below in the biographical sketches of key personnel (Section III) and in Appendix Table C.3, faculty research projects provide abundant opportunities for education-focused mentored research. Examples include Cook's random-assignment, mixed-method evaluation of Comer School; Edelson's planned random assignment evaluation of his *Looking at the Environment* curriculum; Spillane's work on effects of school leadership practice on teachers and teaching practice; Rosenbaum's work on the school-to-work transition; Waxman and Medin's cross-cultural study of acquisition of knowledge of the biological world; Taber's work on the efficacy of school vouchers; Chase-Lansdale's work on school success within the Three-City Study; Gentner's studies of analogy; and Uttal's studies of symbolic development.

Research partnerships. Research mentoring will be facilitated by a number of education-related research partnerships that Northwestern faculty have established over the past decade (see letters of support in Appendix A). Through university-school research and development partnerships such as the NSF-funded Centers for Learning Technologies in Urban Schools (LeTUS) and Curriculum Materials in Science (CCMS), Northwestern faculty established partnerships with the Chicago and Evanston Public School districts to investigate the use of innovative curriculum materials, learning technologies, and professional development approaches to initiate and sustain educational improvement. In collaborations extending over a decade, teachers and administrators in both districts have worked with Northwestern faculty to develop and implement curricula and professional development for science, mathematics, and literacy. These school districts have been the context for numerous design experiments and evaluation efforts which served the dual purpose of refining specific designs and informing design theories (Edelson, 2002).

The Lighthouse Partnership provides an infrastructure for collaboration between Northwestern's School of Education and Social Policy and the Evanston-Skokie Community School District 65. The Partnership has involved numerous collaborations among SESP faculty, staff, and graduate students with District 65 teachers and staff. One project involved the creation and implementation of inquiry-based middle school science units designed by SESP faculty, field tested in District 65 classrooms, and ultimately incorporated into the district's middle school curriculum. A second project involving SESP faculty and graduate students studied the

district's initiation and current expansion of its Two Way Immersion bilingual education program for Spanish and English dominant students. A third study, conducted by SESP faculty and six graduate students used a matched-pairs, quasi-experimental teacher observation study to identify the reading instructional strategies of teachers who were successful with second to fifth grade African-American students. These school district relationships, which extend from the chief educational officer to the individual principal and teacher level, provide an infrastructure for supporting research in diverse schools and classrooms.

We would also develop research partnerships with MDRC with regard to its education evaluation portfolio. We would follow a highly successful model of nearly 10 years of collaboration between Northwestern University and MDRC examining child outcomes in random-assignment welfare-to-work experiments. Project collaborations have involved qualitative fieldwork and quantitative analyses of the random-assignment Milwaukee New Hope project, as well as research syntheses of data from seven MDRC random-assignment welfare-to-work experiments. All told, ten graduate students as well as training grant faculty from Northwestern have been involved in this work. We propose similar collaborations with MDRC's education evaluation projects.

Instruction in the responsible conduct of research. Training in research ethics will be an important part of our training program. The heart of this training will come from the three-year period of research mentoring that trainees will receive from core and affiliated faculty. There is no substitute for observing research ethics applied repeatedly in the context of actual research projects and publications.

A formal training program in research ethics is offered by Northwestern University's Graduate School and will be incorporated into our training program. It consists of a workshop series open to all graduate students at Northwestern. Postdoctoral trainees and faculty also are invited to join the workshops. They will include lectures by the instructor, guest lectures, panel presentations by Northwestern faculty and administrators, and discussion of case studies. A web page, entitled *The Academic Ethicist*, will permit students to post questions and ethical dilemmas. Workshop participants, including faculty and students, will be encouraged to respond by identifying issues in ethical decision-making.

Human-subjects training will be another explicit element of the training program. Beginning trainees will attend a half-day workshop on human-subjects issues prior to beginning their apprenticeship period. A portion of the training will consist of presentations by administrators of the Northwestern University Office for the Protection of Research Subjects (OPRS), which assists investigators in fulfilling their obligation to plan and conduct experiments using human or animal subjects in accord with the highest scientific, humane, and ethical principles and in conformity with all laws, regulations, and rules governing research subjects. Students will also complete the Northwestern IRB computer-based training and certification program. All students will be required to obtain the NIH Certificate of Confidentiality prior to beginning their training activities.

II. MANAGEMENT, INSTITUTIONAL COMMITMENT and PROGRAM EVALUATION

II. A. Program direction

Responsibilities for program direction will be shared over the five years of the grant by James Spillane, Lindsay Chase-Lansdale and Greg J. Duncan. With respective backgrounds in education, developmental psychology and economics, strong records in interdisciplinary research collaborations, and the shared institutional home of the Human Development and Social Policy program, their leadership will provide the scope and continuity needed for such an ambitious training program.

Spillane will serve as director of the training program for the first three years. Chase-Lansdale will serve as deputy director for the first two years. Duncan, who is on leave during the 2004-5 academic year, will serve as deputy director in year 3 and will direct the program in years

4 and 5. All three have strong research records and are engaged in ongoing research projects that illustrate the kinds of mentoring available to fellows during the early years of the program.

During the first three years, Spillane, in consultation with Chase-Lansdale and Duncan, will oversee the recruitment, admissions, and apprenticeship assignment process, organize orientation sessions, plan the seminar series, and monitor student progress. The training program will be governed by a steering committee consisting of the director, deputy director, departmental coordinators and other “core” faculty. Specifically, the steering committee in its initial years will consist of Spillane, Chase-Lansdale and Duncan, along with Cook (program coordinator for sociology), Taber (economics coordinator), Uttal (psychology coordinator), Edelson (Learning Sciences coordinator), Rosenbaum, Spencer, Taber, and Waxman. It is expected that this committee will meet several times during the first few months of the program and then once per quarter during the bulk of the grant period. Key decisions regarding selection of trainees and finalization of the seminar schedule will be made by this committee.

The administrative home of the training grant is the School of Education and Social Policy (SESP), which is the home of HDSP and the Learning Sciences program and the academic home of Spillane, Chase-Lansdale and Duncan. More detailed information on the SESP, the Weinberg College of Arts and Sciences, the Institute for Policy Research, and other institutional resources are provided in Section IV.

Trainee progress evaluations. Trainees will be evaluated annually. The first step will be the annual evaluation within the student’s home department, since students must make adequate progress in their programs to remain members of the education training program. The second step will be an evaluation of the student’s progress in the interdisciplinary training grant program. Each spring, trainees will be asked to write a short summary of their progress in their disciplinary program, research activities conducted as a trainee, evaluation of the year’s seminars, short-run plans for the remainder of graduate school, and long-run job market plans. They will also be asked to reflect on whether and how the training program has affected their intellectual identity. The 10-member steering committee will read and review these summaries and discuss each in turn. Depending on where the students are in the program, these reviews will focus on everything from students’ performance in core and optional courses, the quality of their research work, and their participation in the scholarly community, e.g., conference presentations and journal article submissions.

The director will provide written feedback from the review to the trainee and to his or her research mentor. When necessary, the mentor and trainee will provide a written plan of action to address any areas in need of remediation as identified as part of this annual review process. Such a plan of action, for example, might call for some additional coursework on a particular issue or research method or might involve the mentoring supporting the trainee’s work on a particular assignment such as writing a journal article. While we anticipate that careful mentorship and program oversight will lead to the graduation of all trainees, during the program’s first year the steering committee will determine the circumstances under which a trainee would be asked to leave the program, and how such a dismissal would be handled.

II. B. Trainee quality

As with past Northwestern University social science training programs, we anticipate that the quality of trainees will be very high. Shown in Appendix Table C.1 are background, test scores, and minority status of all entering students in the various departmental programs for 2001-2, 2002-3 and 2003-4. This table shows a high degree of selectivity as well as low rates of attrition across all programs.

II. C. Recruitment of individuals from underrepresented groups and persons with disabilities

Appendix Table C.1 also provides a summary of minority applications, admissions, and matriculation in the proposed training program. The most successful department is sociology, with 67 minority applicants and 37 admitted minority students, resulting in 11 entering students during the past three years. The number of minority applicants to the other departments

(economics, HDSP, LS, psychology) is lower, with 3-year total enrollees ranging from zero in economics and psychology to 2 in HDSP and 8 in LS. We see the proposed training grant as a key new mechanism for recruiting more students from underrepresented groups.

For all of the graduate students from underrepresented groups, the departments and the Graduate School are committed to full funding during doctoral training. This includes a combination of university fellowships, minority fellowships, research assistantships and teaching assistantships, as well as funds from outside sources.

Of relevance to the proposed training grant is our record in training minority students under the prior training grants. Of the 43 Northwestern graduate fellows in the JCPR training program, 11 were members of minorities. Of the 26 Northwestern graduate fellows in the Spencer Training Program, 12 were minority students. The majority of the JCPR minority fellows are quite successful, having obtained assistant professorships or postdoctoral fellowships at a variety of universities, including public policy positions at Carnegie Mellon and the University of Texas-Dallas and an economic job at the University of Wisconsin.

As a newly established training program, we would work vigorously to recruit graduate students from underrepresented groups. The director, Spillane, and the two co-directors, Chase-Lansdale and Duncan, would take responsibility for developing and implementing a multifaceted strategy for recruitment. They would work closely with department coordinators from psychology, sociology and economics.

We will also collaborate with the Graduate School on a variety of recruitment efforts, including participating in the Summer Research Opportunity Program (SROP), which reaches out to promising undergraduates from underrepresented groups in various universities and links them with a research mentor at Northwestern, and meeting, welcoming, and following up with minority visitors at department recruiting weekends. We will develop a website, brochure, and mailing list targeted to key departments and colleagues and advertise in the relevant professional journals and at conferences related to our disciplines.

Each fall, we will develop a marketing and recruitment plan that will identify potential pools from which we might recruit trainees. For example, one potential pool might be Teach for America; participants in this program typically have strong undergraduate training, often in one of the core disciplines, and their participation in Teach for America provides them with invaluable first hand experience in schooling America's poor students. Further, they are typically deeply committed to education and its improvement.

Concerted efforts will be devoted to recruiting minority trainees. Examples of groups we will approach for this purpose are the Association of Black Psychologists; the participants in the five Summer Institutes sponsored by the NIMH Family Research Consortium; the new Foundation for Child Development Scholars of Immigrant Children; the newly proposed Hispanic Caucus of the Society for Research in Child Development; the some 50 scholars who were funded by the Minority Fellowship Program of the American Psychological Association during the past 20 years; the Millennium Fellows Program, which hosts mentored undergraduates at the biennial meetings of the Society for Research in Child Development; the participants in the annual colloquia of outstanding minority undergraduates in the NIMH Career Opportunities in Research Education (COR) scholars program, which includes a graduate recruitment fair as a regular part of the annual agenda; fellows from the Summer Institute for Demographic Research at the University of Pennsylvania, which offers graduating minority undergraduates a research experience in a summer institute; and fellows from the American Sociological Association's MOST (Minority Opportunities through School Transformation) program.

Northwestern University is committed to supporting a diverse student body by providing a learning environment without physical and psychological barriers to education for students with disabilities. NU provides a variety of services to assist students with disabilities in becoming active members of the University community. Services vary according to the type and level of impairment experienced by each student. The majority of these services are coordinated by the Office of Services for Students with Disabilities (SSD). SSD organizes disability services in a manner that promotes, to the greatest extent possible, self-determination for people with

disabilities and also engages the entire campus community in issues of access. Providing equal access for students with disabilities is a shared university responsibility that involves academic units, faculty, and staff across programs.

III. PERSONNEL

III. A. Overview

The core and affiliated faculty assembled for this training grant (see Appendix Table C.2 for a complete list) represent a diverse range of relevant research interests across anthropology, economics, psychology, law and sociology. Both HDSP and LS faculties include scholars from the disciplines of psychology, economics, sociology, computer science and cognitive science, some of whom are education specialists. Three-page bios and Appendix Table C.3 list current and pending research support for core and affiliate faculty, respectively.

III. B. Program directors and deputy directors

James P. Spillane is a Professor in both the Human Development and Social Policy and the Learning Sciences graduate programs at Northwestern University and a Faculty Fellow at the Institute for Policy Research. Spillane will devote 22% of his time as director in years one through three, and will spend 15% of his time as deputy director in years four and five. He will also teach the required Field Methods course and the required course Education Policy and Classroom Learning: Choice, Charters, & Standards as well as three of the elective courses.

Two of Spillane's programs of research illustrate the kinds of research mentoring he would provide graduate fellows. For more than a decade, Spillane has employed mixed methods to examine the implementation of state, federal, and local school district education policy. This work, funded by the National Science Foundation, develops a cognitive model to illuminate the interactions among what government policies say, what local officials understand those policies to say, and the way local officials construe the actions they take in response to policy. This work has focused on policies that were intended to improve instruction in literacy, mathematics and science. Among other things, this work has shown the important role of the local school district (central office) in the implementation of state and federal policies. The second program of research focuses on school leadership in mathematics, science, and literacy instruction in urban elementary schools, investigating leadership as a distributed practice. Involving mixed methods, the theory-building phase of this work has generated new conceptions of leadership as practice and new insights into relations between school leadership and teaching. Spillane is currently extending this work through two new studies that are designed to examine relations among programs for leadership development, leadership practice in schools, and classroom instruction, one of which (grant pending) would use random assignment to investigate the effects on leadership practice on classroom instruction.

P. Lindsay Chase-Lansdale, a Professor in the School of Education and Social Policy and a faculty fellow at the Institute for Policy Research at Northwestern University, will spend 15% of her time as co-director in the first two years of the grant. A developmental psychologist, she specializes in multidisciplinary research on social issues and how they affect family functioning and the cognitive and social development of children. She teaches a core course on child development that emphasizes key developmental dimensions of learning and social competence as well as the experiences that promote a successful transition to school.

Examples of how Chase-Lansdale would mentor graduate fellows are shown in her large research project entitled Welfare Reform and Children: A Three-City Study of 2400 families and children in Boston, Chicago, and San Antonio. The Three-City Study was originally designed as a multi-method examination of the consequences of welfare reform for the well-being of children and families. Currently, Chase-Lansdale and her colleagues are gathering data to address why low-income children and youth "defy the odds" and are successful in school. Chase-Lansdale has extensive experience directing a large, collaborative research team of graduate students, postdoctoral fellows and undergraduates. With this research team, Chase-Lansdale has emphasized school readiness as a major theme, and she is mentoring two students, both of whom

have won the prestigious Spencer Foundation Dissertation Fellowship Award, on educational policy questions using the ECLSK. Since the beginning of her professorship at Northwestern in 1999, Northwestern University graduate and postdoctoral students working with her have presented over 25 papers or posters from the Three-City Study, the ECLSK and other data sets at professional meetings and have also been coauthors of the policy briefs emanating from the study and disseminated to federal, state, and local policymakers.

Greg J. Duncan, the Edwina S. Tarry Professor in the Human Development and Social Policy program at Northwestern University, will spend 15% of his time as deputy director of the training grant in year three and 22% of his time directing the grant in years four and five. He also teaches two core courses: Economics and Social Policy (an intermediate microeconomics course laden with policy examples) and an applied regression class. Duncan supervised JCPR's training activities during the period between 1998 and 2003.

Three of Duncan's ongoing research projects illustrate the kinds of research mentoring he would provide graduate fellows. The first focuses on an evaluation of schooling and other child outcomes in the Milwaukee New Hope project, a work-based support program begun in 1995. The New Hope evaluation, conducted in conjunction with MDRC, embeds an intensive, longitudinal, qualitative study within a larger, survey-based study of participants enrolled in a random-assignment welfare experiment. To date, seven Northwestern University graduate students in sociology and HDSP have served as interviewers, coders, or data analysts and have presented numerous papers at professional meetings. Second, and also in collaboration with MDRC, Duncan is seeking to extract lessons about child school achievement impacts from seven random-assignment experiments (one of which is New Hope). Third, Duncan and several collaborators are researching peer effects among college students using the random assignment of roommates to solve the self-selection problem that bedevils peer-effects research. Replications are planned for two additional universities.

III. C. Core Faculty

Thomas D. Cook is the Joan and Serepta Harrison Chair of Ethics and Justice and a Professor in the Sociology and Psychology Departments as well as in the Human Development and Social Policy Program of the School of Education and Social Policy. He is also a Fellow at the Institute for Policy Research. Cook will spend 10% of his time as coordinator of the sociology component of the training grant.

His research interests of relevance to education are fourfold. First, he writes on the design of randomized experiments and quasi-experiments in school settings, including why educational research has made little use of random assignment since the 1960s. He does this to show which arguments against such assignment merit and do not merit serious consideration and to illustrate how consideration of the better arguments provides clues as to how experiments in education can be improved.

His second interest is in evaluating whole-school reforms. He has examined Comer's School Development Program in Prince George's County (Cook et al, 1999) and Chicago (Cook et al, 2000) using random assignment and in Detroit (Milsap et al, 2001) using a design with stable bracketed school-level matching. His third interest is in how schools relate to other socializing agencies like neighborhoods, families and peer groups. Fourth, Cook is very active in providing advice to IES initiatives designed to improve cause-testing educational research. He serves on the Independent Review Panel for Title 1 and on the independent technical oversight group for the What Works Clearinghouse. He is also a member of technical working groups for studies of Even Start, Reading First, magnet schools, charter schools, professional development activities, educational technology, after-school activities and preventing school violence. He is therefore in a unique position to mentor students investigating how changes in the system of federally sponsored contract research activities are related to improved causal inferences in education.

Daniel C. Edelson is an Associate Professor at Northwestern University with joint appointments in the School of Education & Social Policy and the Department of Computer Science. Since 2001, he has served as the Coordinator of the Learning Sciences Program in the School of Education and Social Policy. Edelson teaches courses on the application of cognitive

science research to the design and use of curriculum and software. Edelson will spend 10% of his time as coordinator of the learning sciences component of the training grant.

Edelson conducts research on the design of software, curriculum materials and teacher professional development to support inquiry-based learning. Trained as a computer and cognitive scientist, Edelson develops and studies software and curricula that are informed by contemporary research on learning, motivation, and social/cultural dynamics. Edelson has led the development of a number of software environments including My World, a geographic information system for inquiry-based learning, and the Progress Portfolio, an inquiry-support tool for students engaged in open-ended investigations. With the support of a grant from NSF's program in Instructional Materials Development, Edelson has recently completed the development of a one-year high school environmental science curriculum that is grounded in research on learning and motivation in science. He is currently collaborating with faculty at Northwestern and elsewhere to design random assignment trials that will investigate the educational effectiveness of critical design features of the curriculum and the costs and benefits of different approaches to on-line professional development for teachers.

James Rosenbaum is President-elect of the Sociology of Education section of the American Sociological Association. He will spend 10% of his time on the training grant as a core faculty member and will teach a core course on the sociology of education. Rosenbaum's work focuses on issues from school-to-work transitions to the changing role of college in American society. His work on the high school-to-work transition analyzes large-scale national longitudinal surveys to examine the short and long-term consequences of high school curriculum and jobs on later educational and labor market success when subjects reach the age of 26. These analyses are supplemented by locally collected data from 12 high schools in the Chicago metropolitan area, including a large survey of students and detailed interviews with teachers and administrators.

Analyzing national longitudinal data sets spanning three decades, Rosenbaum and graduate students are analyzing the changing status-attainment process in terms of the kinds of students attending college and the consequences emanating from shifts in the student population. The separate role of community colleges in transforming the educational and occupational attainment processes is of particular interest.

Bruce D. Spencer, Professor in the Department of Statistics and in the School of Education and Social Policy, will devote 10% of his time serving as a core faculty member for the training grant program. He will teach two courses for the program, Survey Sampling and Statistical Demography. The Survey Sampling course treats the sampling designs used by the government to develop education statistics and draws on Spencer's work with NCES, NORC, TIMSS and the NAE review of State NAEP. From 1982 to 1994 he also held positions at NORC, where he worked on a variety of sampling designs for educational longitudinal studies as well as the National Study of Postsecondary Faculty, among others. In the area of educational assessment, he has served on the U.S. Steering Committee for the TIMSS and as a consultant for the National Academy of Education in its review of the trial state NAEP assessment and for the National Institute of Statistical Sciences in its development of guidelines for predicting standard errors for subgroups in NAEP analyses prior to sample selection.

Christopher Taber is Associate Professor in the Economics Department and the Institute for Policy Research at Northwestern. Taber will spend 10% of his time as coordinator of the economics component of the training grant and will teach a core course on the economics of education. Taber has two projects closely related to the training grant. Catholic schools account for about two-thirds of private school enrollment, but do they provide a better education at lower cost than other schools? Taber's research has measured the effect of Catholic high-school attendance on educational attainment and test scores. To deal with the bias that may arise because selection into Catholic schools is not random, he and his colleagues developed new estimation methods based on the idea that the amount of selection on the observed explanatory variables that determine educational outcomes provides a guide to the amount of selection on the unobservables.

A second project estimates the effect of voucher programs on educational outcomes of children by addressing the question: will a voucher program for private schools lure the best students away from public schools, with negative consequences for those who remain behind? Using their model, data on classmates, and their methodology for using selection on observables to learn about selection on unobservables, they simulate voucher effects. This information will be incorporated into the overall model to simulate aggregate effects of voucher programs.

David H. Uttal is Associate Professor of Psychology in the Weinberg College of Arts and Sciences and a member of the Learning Sciences program in the School of Education and Social Policy. Uttal will spend 10% of his time as coordinator for the psychology component of the training grant. Two important characteristics of Uttal's work are relevant to this proposal. First, his research is often collaborative and interdisciplinary in nature, involving researchers not only from psychology and education but also from the natural sciences (chemistry and geology). Second, Uttal explicitly links the approaches of cognitive psychology and education research. For example, in research funded by IES, Uttal is studying the role of playing with concrete objects on young children's understanding of the symbolic functions of letters, numbers, and mathematics manipulatives. This work includes experimental studies of home- and school-based interventions to understand how working with concrete objects improves children's understanding of the symbolic properties of letters and numbers. Students who work on this and related projects gain extensive experience that links psychology and education.

Uttal also conducts research on the development of spatial cognition, again with a focus on the role of symbol systems (maps). This work, which is funded by NSF, has investigated the bi-directional relationship between children's developing conceptions of large-scale space and their understanding of spatial symbols, such as maps. The work is educationally related in that it involves an investigation of how learning a particular symbol system influences children's understanding of what the symbol system represents.

Sandra R. Waxman, Professor of Psychology in the program in Cognitive Psychology, will spend 10% of her time on the training grant in years. She also teaches a core course for graduate students. Two long-term NICHD research projects demonstrate Waxman's ability in and commitment to leading teams of researchers in complex investigations of significant issues in education and developmental psychology. The first, a five-year project titled "Biological Thought: A Cross-Cultural View," focuses on the acquisition of knowledge of the biological world. A major goal is to widen the existing empirical base beyond majority-culture children, and the project has used a broad cross-cultural subject population to address the development of concepts of biology, with the goal of effective design of science curricula for the growing population of non-majority, non-urban children in U.S. schools. The research takes place within schools in a broad range of cultures; students are trained to work with each of these populations.

The second NICHD project, "Linking Early Linguistic and Conceptual Development," addresses the fundamental issues of early conceptual development and language development, as well as the linkages between the two across languages and across development. Eight graduate students have been involved in this research. Although the focus of this work is primarily basic science, Waxman's work in this area has gained her recognition as a leader in setting the research agenda for bilingual children in our country. She recently presented papers at the Workshop on Bilingualism and bilingual education at NICHD (April, 2004).

III. D. Affiliated faculty

A list of faculty affiliated with the training grant is given in Appendix Table C.2. Their current research funding is listed in Appendix Table C.3. Space constraints preclude a detailed discussion of their expertise and accomplishments. Suffice it to say that the group is exceedingly diverse and includes faculty from our core disciplines plus anthropology, law and the Kellogg School of Business, with expertise ranging from school finance to students' mathematics learning.

III. E. New faculty hire

As part of this proposal we are seeking funding to support the hiring of a new faculty member who specializes in investigating relations between classroom instruction and student learning in either mathematics or reading. We will recruit a scholar who can bridge the Learning Sciences and Psychology programs, and whose work focuses on studying the effects of classroom instruction on student learning, using rigorous methods for establishing causal inferences. Such a scholar might, for example, study the effects of particular mathematics programs (e.g., Connected Mathematics, Investigations Math, Chicago Math) on student achievement. A scholar of this sort would capitalize on the existing strengths of both the Learning Sciences and the Psychology programs and be jointly appointed in both.

IV. RESOURCES

IV. A. Intellectual resources

The Graduate School at Northwestern University is committed to providing an outstanding graduate education through a strong research environment, mentoring by stellar faculty, and support for the development of our graduate students as scholars. More than 2,500 graduate students are engaged in study and research at Northwestern. They work with 900 graduate faculty who include Nobel and Pulitzer prize winners, MacArthur Fellowship recipients, and members of the National Academy of Sciences, the National Academy of Engineering, the American Academy of Arts and Sciences, and the American Council of Learned Societies. Northwestern provides extensive research facilities, and faculty in 2000-01 received more than \$325 million in research awards.

The administrative home of the training grant is the School of Education and Social Policy (SESP). The SESP is the smallest school at Northwestern University, with 23 faculty divided mainly between the Human Development and Social Policy (HDSP) and Learning Sciences Ph.D. programs. Despite its size, the latest *U.S. News and World Report* graduate school rankings put SESP in eleventh among schools of education, in part on the basis of the GRE scores of its graduate students, which are considerably higher than those of students in any other education school in the country. (SESP's combined verbal and quantitative GRE scores were only marginally less than top-ranking Harvard and Stanford.) SESP research funding, which totaled \$10.5 million in fiscal year 2003, is also remarkably high for a school of its size.

Northwestern University's Weinberg College of Arts and Sciences is home to 500 faculty members, 900 graduate students, and the departments of economics, sociology and psychology. The latest *U.S. News and World Report* ranks the economics department eighth, the sociology department ninth, and the psychology department seventeenth in the nation.

The grant's director and deputy directors and most core and affiliated faculty hold appointments with Northwestern University's Institute for Policy Research. The IPR mission is to stimulate and support excellence in social science research on significant public policy issues and to disseminate the findings widely to students, scholars, policymakers and the public at large. It provides a strong infrastructure to facilitate faculty research, including grants management, office space for center-affiliated researchers, dissemination of research results through a regular working-paper series, and data processing.

IV. B. Research resources

The Northwestern University School of Education and Social Policy (SESP) will be the administrative home for the proposed effort. SESP is located in Walter Annenberg Hall, a recently constructed building on Northwestern's Evanston Campus which opened in the fall of 1993. Psychology coordinator and affiliates Uttal and Gentner will be maintaining their principal offices in Annenberg beginning in the summer of 2004. Annenberg and buildings housing psychology, economics and sociology are fully networked, with multiple T-1 connections for outside access. Available to training grant faculty in some of these buildings are networked "smart classrooms" and state-of-the-art learning studios for recording, editing, compiling and producing high-resolution video records for educational research purposes. Also available is

laboratory space comprised of two three-room suites including three rooms equipped with video cameras and recorders for running child studies, as well as rooms for parents accompanying children. The investigators at Northwestern share a child recruitment database of approximately 5,400 children in 3,500 families. This secured database is developed continually through direct-mail recruitment drives, posting of flyers in the community surrounding Northwestern, and word of mouth.

Desktop computers are available for developing stimuli including 3D animations, for data analysis, for viewing and archiving digital video, for database creation and use, and for maintaining network connectivity and file sharing. Portable computers, including various tablet and notebook machines, and video cameras, video cassette recorders and players, and large-format color video monitors are available for off-site data collection.

P. Lindsay Chase-Lansdale

Education

B.A., Social Relations, Harvard University, Radcliffe College, 1974
Ph.D., Developmental Psychology, The University of Michigan, 1981

Positions and Employment

1981-1982 Congressional Science Fellow in Child Development, The Honorable Paul Simon, U.S. House of Representatives.
1982-1985 Associate Director, Washington Liaison Office, Society for Research in Child Development.
1985-1988 Postdoctoral Fellow, Program in Research on Family Processes and Psychopathology, The NIMH Family Research Consortium.
1988-1990 Research Associate Professor, Department of Psychiatry and Behavioral Sciences, The George Washington University of Medical Center.
1989- 1999 Adjunct Faculty Member, Department of Psychology, The University of Chicago.
1989-1993 Senior Research Scientist for Developmental and Family Research, The Chapin Hall Center for Children, The University of Chicago.
1991-1996 Assistant Professor, The Irving B. Harris Graduate School of Public Policy Studies, The University of Chicago.
1996-1999 Associate Professor, The Irving B. Harris Graduate School of Public Policy Studies, The University of Chicago.
1999- Professor, Human Development and Social Policy Program, School of Education and Social Policy, Northwestern University.

Honors

Phi Beta Kappa, Harvard University, 1973; Kennedy Institute Research Grant, Harvard University, 1973; Magna Cum Laude, Social Relations, Harvard University, 1974; Rotary International Foundation Fellowship for Study Abroad, 1974-1975; Danforth Foundation Fellowship, 1975-1979; Bush Program in Child Development and Social Policy Fellowship, 1979-1980; Excellence in Teaching Award, Harris School, 1996; Chair, Board of Directors, Foundation for Child Development, 2002-present; Martin E. and Gertrude G. Walder Award for Research Excellence, Northwestern University, 2004.

Selected Publications

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Chase-Lansdale, P.L., & Brooks-Gunn, J. (1994). Correlates of adolescent pregnancy and parenthood. In C.B. Fisher & R.M. Lerner (Eds.), *Applied Developmental Psychology* (pp. 207-236). New York: McGraw-Hill, Inc.
Chase-Lansdale, P.L. & Brooks-Gunn, J. (Eds.). (1995). *Escape from poverty: What makes a difference for children?* New York: Cambridge University Press.
Chase-Lansdale, P.L., Cherlin, A.J. & Kiernan, K.E. (1995). The long-term effects of parental divorce on the mental health of young adults: A developmental perspective. *Child Development*, *66*, 1614-1634.
Chase-Lansdale, P.L. & Gordon, R.A. (1996). Economic hardship and the development of 5-and 6-year-olds: Neighborhood and regional perspectives. *Child Development*, *67*, 3338-67.

- Gordon, R.A., Chase-Lansdale, L. P., Matjasko, J.L. & Brook-Gunn, J. (1997). Young mothers living with grandmothers and living apart: How neighborhood and household contexts relate to multigenerational coresidence in African-American families. Applied Developmental Science, 1, 89-106.
- Coley, R.L., & Chase-Lansdale, P.L. (1998). Adolescent pregnancy and parenthood: Recent evidence and future directions. American Psychologist, 53, 152-166.
- Chase-Lansdale, P.L. (1999). Effects of poverty on children and families. In L. B. Joseph (Ed.), Families, poverty, and welfare reform: Confronting a new policy era (pp. 245-281). Chicago: University of Illinois Press.
- Coley, R. L., & Chase-Lansdale, P. L. (1999). Stability and change in paternal involvement among urban African American fathers. Journal of Family Psychology, 13(3), 416-435.
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- Coley, R.L., & Chase-Lansdale, P.L. (2000). Welfare receipt, financial strain, and African-American adolescent functioning. Social Service Review, 380-404.
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- Moore, M.R. & Chase-Lansdale, P.L. (2001). Sexual intercourse and pregnancy among African-American adolescent girls in high poverty neighborhoods: The role of family and perceived community involvement. Journal of Marriage and the Family, 63, 1146-1157.
- Pittman, L.D., & Chase-Lansdale, P.L. (2001). African-American adolescent girls in impoverished communities: Parenting style and adolescent outcomes. Journal of Research on Adolescence, 11, 199-224.
- Adam, E. & Chase-Lansdale, P.L. (2002) Home(s) sweet home: Parental separation, residential moves, and adjustment problems in low-income adolescent girls. Developmental Psychology, 38, 792-805.
- Chase-Lansdale, P.L., & Pittman, L.D. (2002). Welfare reform and parenting: Reasonable Expectations. In M.K. Shields (Issue Ed.), Future of Children, Vol. 12, No. 1: Children and Welfare Reform (pp. 167-183). The David and Lucile Packard Foundation, Los Altos, CA.
- Chase-Lansdale, P. L., Moffitt, R. A., Lohman, B. J., Cherlin, A. J., Coley, R. L., Pittman, L. D., Roff, J., and Votruba-Drzal, E. (2003). Mothers' Transitions from Welfare to Work and the Well-Being of Preschoolers and Adolescents. Science, 299(5612), 1548-1552.
- Chase-Lansdale, P.L., Kiernan, K., & Friedman, R.J. (Eds.) (in press). Human development across lives and generations: The potential for change. New York: Cambridge University Press.

- Chase-Lansdale, P.L., & Votruba-Drzal, E. (in press). Human development and the potential for change from the perspective of multiple disciplines: What have we learned? In P.L. Chase-Lansdale, K. Kiernan, & R.J. Friedman, (Eds.). Human development across lives and generations: The potential for change. New York: Cambridge University Press.
- Votruba-Drzal, E., Coley, R. L., & Chase-Lansdale, P. L. (2004). Child care quality and low-income children's development: For who is child care most important? Child Development, 75, 296-392.
- Lohman, B.J., Pittman, L.D., Coley, R.L., & Chase-Lansdale, P.L. (2004). Welfare history, sanctions, and developmental outcomes among low-income children and youth. Social Service Review, 78(1), 41-73.

Ongoing Research Support

The Searle Fund *Chase-Lansdale (PI)*

12/1/02 – 11/30/04

Children, Families, and Welfare: A Three-City Study

The major goal of this project is to investigate the effects of maternal welfare and employment transitions on the health and well-being of children and adolescents. In addition to analyzing collected data, design and preparation of the follow-up of families is also a priority.

Thomas D. Cook

Education

- B.A., German and French, Oxford University, 1963
- B.A., Sociology, University of the Saar (Germany), 1963-1964
- Ph.D., Communications Research, Stanford University, 1967

Positions and Employment

- 1967-1968 Visiting Assistant Professor, Department of Psychology, University of North Carolina
- 1968-present Assistant Professor to Professor, Department of Psychology, Northwestern University
- 1983-present Professor, Program in Human Development and Social Policy, School of Education and Social Policy, Northwestern University
- 1983-present Faculty Research Fellow, Institute for Policy Research, Northwestern University
- 1989-present Professor, Department of Sociology, Northwestern University
- 2002-2003 John Evans Professor of Sociology
- 2003 Joan and Serepta Harrison Chair of Ethics and Justice

Honors

Myrdal Prize for Science, American Evaluation Association, 1982; Donald Campbell Prize for Innovative Methodology, Policy Sciences Organization, 1988; Distinguished Research Scholar Prize, Division 5, American Psychological Association, 1997; Fellow, American Academy of arts and sciences, 2000; Margaret Mead Fellow, American Academy of Political and Social Science, 2003.

Selected Publications

- Cook, T.D., Appleton, H., Conner, R., Shaffer, A., Tamkin, G. & Weber, S. J. (1975). "Sesame Street" revisited. New York: Russell Sage Foundation.
- Cook, T.D., Del Rosario, M., Hennigan, K., Mark, M. & Trochim, W. (Eds.). (1978). Annual review of evaluation studies (Vol. 3). Beverly Hills, CA: Sage.
- Cook, T.D. & Campbell, D. T. (1979). Quasi-experimentation: Design and analysis issues for field settings. Boston: Houghton Mifflin – designated a “citation classic”.
- Cook, T.D. & Reichardt, C. S. (Eds.). (1979). Qualitative and quantitative methods in evaluation. Beverly Hills, CA: Sage Publications.
- Shadish, W.R., Cook, T.D. & Leviton, L.C. (1991). Foundations of program evaluation: Theories of practice. Newbury Park, CA: Sage Publications
- Cook, T.D., Cooper, H., Cordray, D., Hartmann, H., Hedges, L., Light, R., Louis, T., Mosteller, F. (Eds.). (1992). Meta-Analysis for explanation: A casebook. New York: Russell Sage Foundation.
- Panel on High-Risk Youth, Commission on Behavioral and Social Sciences and Education, National Research Council (1993). Losing generations: Adolescents in high risk settings. Washington, D.C.: National Academy Press
- Furstenberg, F.F., Jr., Cook, T.D., Eccles, J., Elder, G.H., & Sameroff, A. (1999). Managing to make it: Urban families in high-risk neighborhoods. Chicago: University of Chicago Press.

- Shadish, W.J., Cook, T.D. & Campbell, D.T. (2002). Experimental and quasi-experimental designs for generalized causal inference. Boston: Houghton Mifflin.
- Panel on Community-Level Programs for Youth. (2002). Community Programs to promote Youth Development. Washington, DC: National Academy Press.
- Cook, T.D., Habib, F., Phillips, M., Settersten, R.A., Shagle, S.C., Degirmencioglu, S.M. (1999). Comer's School Development Program in Prince George's County: A theory-based evaluation. American Educational Research Journal, 36(3), 543-597.
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- Cook, T.D. (2000). The false choice between theory-based evaluation and experimentation. New Directions in Evaluation: Challenges and Opportunities in Program Theory Evaluation. 87, 27-34.
- Cook, T.D. (2000). Towards a practical theory of external validity. In L. Bickman (Ed.) Contributions to Research Design: Donald Campbell's Legacy. Volume I. Newbury Park, CA: Sage.
- Cook, T.D. (2001). Sciencephobia: Why education researchers reject randomized experiments. Education Next. 1(3), 6268
- Cook, T.D. & Payne, M. R. (2001). Objecting to the objections to using random assignment in educational research. In F. Mosteller & R.F. Boruch (Eds.) Evidence Matters. Washington, D.C.: Brookings Institute Press.
- Cook, T.D., Herman, M, Phillips, M & Setterston, R.J., Jr. (2002). Some ways in which neighborhoods, nuclear families, friendship groups and schools jointly affect changes in early adolescent development. Child Development, 73(4), 1283-1309.
- Fleming, J.E., Cook, T.D., & Stone, C.A. (2002). Interactive influences of perceived social contexts on the reading achievement of urban middle schoolers with learning disabilities. Learning Disabilities Research & Practice, 17(1), 47-64.
- Cook, T.D., & Furstenberg, F.F., Jr. (2002). Explaining the transition to adulthood: A multi-disciplinary, case study synthesis for Italy, Sweden, Germany and the USA. Annals of American Academy of Political and Social Science, 580, 257-287
- Furstenberg, F.F., Jr., Cook, T.D., Sampson R, & Slap, G (2002). Preface to special number on early adulthood in cross-national perspective. Annals of American Academy of Political and Social Science, 580.6-15
- Cook, T.D. (2002). Randomized experiments in educational policy research: A critical examination of the reasons the educational evaluation community has offered for not doing them. Educational Evaluation and Policy Analysis, 24(3), 175-199.
- Cook, T.D. (2002). Generalization in the social sciences. In N. Smelser & P. Baltes (Eds). Encyclopedia of the Social and Behavioral Sciences. Oxford: Elsevier.
- Cook, T.D. (2002). Die Evaluation. In G. Endruweit & G. Trommsdorf (Eds.) Woerterbuch der Soziologie. 2nd. Edition. Stuttgart: Lucius & Lucius.
- Cook, T.D. (2003) The rationale for studying multiple contexts simultaneously. Addiction 98 (supp 1), 151-155
- Cook, T.D. (2003). Why have educational evaluators chosen not to do randomized experiments? Annals of American Academy of Political and Social Science, 589:114-149

- Cook, T.D. (2004). Beyond Advocacy: Putting History and Research on Research into Debates about the Merits of Social Experiments. Society for Research in Child Development: Social Policy Report. 18: 5-6.
- Cook, T.D., Haertel, G., Meanes, B. & Michalchik, V. (2003). The case for using randomized experiments. In Haertel, G. & Means, B. (Eds.) Evaluating Educational Technology. New York City: Teachers College Press.
- Cook, T.D., & Groom, C. (2003). The methodological assumptions of social psychology: The mutual interdependence of substantive theory and method choice. In Morf, C., Panter, A., & Sansone, C. Handbook of Methods in Social Psychology. Newbury Park, CA: Sage Publications.
- Cook, T.D. (2004). Causal Generalization: How Campbell and Cronbach influenced my theoretical thinking on this topic. In Alkin, M.D. (Ed.). Evaluation Roots: Tracing Theorists Views and Influences. Thousand Oaks, CA: Sage Publications.

Ongoing Research Support

R215K010115

Department of Education (PI)

6/1/01-8/31/04

FIE: School Youth Development Program

The study examines how the Comer's School Development Program affected students' high school test scores, their high school tracks and GPA, and their dropping out. Testing will be done to show whether the initial achievement gains were maintained over time and whether they generalized to affect commitment to the educational process.

The Spencer Foundation (PI)

6/1/00-8/31/04

Explaining the Long Term Effectiveness of the School Development Program

The study is a follow-up to the students originally studied in an experiment on the Comer's School Development Project. Over four years, improvements were noted in the school climate, student test scores, and acting out. This study tests whether the last two individual effects are maintained over time.

Greg J. Duncan

Education

B.A., Economics, Grinnell College, 1970
Ph.D., Economics, University of Michigan, 1974

Positions and Employment

1972-1974 Assistant Study Director, Survey Research Center, Institute for Social Research, University of Michigan
1977-1985 Senior Study Director, Associate Research Scientist, Survey Research Center, University of Michigan
1985-1993 Research Scientist, Survey Research Center, University of Michigan
1985-1993 Co-Director, *Panel Study of Income Dynamics*, Survey Research Center, University of Michigan
1987-1995 Professor, Department of Economics, University of Michigan
1993-1995 Distinguished Research Scientist, Survey Research Center, University of Michigan
1995-2001 Professor, School of Education and Social Policy, Northwestern University
2001-Present Edwina S. Tarry Professor, School of Education and Social Policy, Northwestern University
1995-Present Faculty Affiliate, Institute for Policy Research, Northwestern University
1997-2003 Director/Deputy Director, Joint Center for Research on Poverty, Northwestern University and University of Chicago
1999 Doctor of the University of Essex

Honors

Elected to the American Academy of Arts and Science, 2004.

Selected Publications

Duncan, G.J. and J. Brooks-Gunn. 1997. Growing Up Poor: Consequences for Children and Youth. *The Future of Children*.

Duncan, G.J. and J. Brooks-Gunn (eds.). 1997. *The Consequences of Growing Up Poor*. New York, NY: Russell Sage

Duncan, G.J., J. Brooks-Gunn, and J. Lawrence Aber (eds.). 1997. *Neighborhood Poverty: Context and Consequences for Children*. Volumes I and II. New York, NY: Russell Sage.

Duncan, G.J., J. Yeung, J. Brooks-Gunn, and J. Smith. 1998. How Much Does Childhood Poverty Affect the Life Chances of Children? *American Sociological Review* 63(3):406-423.

Phillips, M., J. Brooks-Gunn, G.J. Duncan, P. Klebanov, and J. Crane. 1999. Family Background, Parenting Practices, and the Black-White Test Score Gap, in *Race and Test Performance*. (eds.) Christopher Jencks and Meredith Phillips. Washington, DC: Brookings Institute.

Brooks-Gunn, J. and G.J. Duncan. 2000. Family Poverty, Welfare Reform and Child Development. *Child Development*, 71(1):188-196.

Yeung, J., G.J. Duncan, and M. Hill. 2000. Putting Fathers Back Into the Picture: Parental Activities and Children's Adult Outcomes. *Marriage and Family Review* 29(2/3):97-113.

Shonkoff, J. and Phillips, D. (eds.) *From Neurons to Neighborhoods: The Science of Early Childhood Development* (committee member and primary author of two report chapters), Washington, D.C.: National Academy Press, 2000.

Huston, A.C., R.C. Granger, G.J. Duncan, J.M. Bos, V.C. McLoyd, R.S. Mistry, D. Crosby, C. Gibson, K. Magnuson, J. Romich, and A. Ventura. 2001. Work-based Anti-Poverty Programs for Parents Can Enhance the School Performance and Social Behavior of Children. *Child Development* 72:318-336.

Hill, M., G.J. Duncan, and J. Yeung. Childhood Family Structure and Young Adult Behavior. *Journal of Population Economics*, Volume 14, No. 2, 2001, pp.271-99.

Ludwig, J., G.J. Duncan, and P. Hirschfield. Urban Poverty and Juvenile Crime: Evidence From A Randomized Housing-Mobility Experiment. *Quarterly Journal of Economics*, Vol. 116, No. 2, May 2001, pp. 665-679.

- Dunifon, R., Duncan, G. and Brooks-Gunn, J. "As Ye Sweep, So Shall Ye Reap" *American Economic Review - Papers and Proceedings*, Vol. 91, No. 2, May 2001, pp. 150-154.
- Harris, K.M., Duncan, G. and Boisjoly, J. "Evaluating The Role Of "Nothing To Lose" Attitudes On Risky Behavior In Adolescence" *Social Forces*, Vol. 80. No. 3, 2001, pp. 1005-1039.
- Duncan, G.J. and S. Raudenbush. 2001. Neighborhoods and Adolescent Development: How Can We Determine the Links,? in *Does It Take a Village?: Community Effects on Children, Adolescents, and Families*. (eds.) A. Booth and N. Crouter. State College, PA: Pennsylvania State University Press.
- Duncan, G.J., L.P. Chase-Lansdale. 2001 "Welfare Reform and Child Well-Being", in Rebecca Blank and Ron T. Haskins (eds.) *The New World of Welfare*, Washington, D.C.: Brookings Institution Press, 2001, pp. 391-417.
- Duncan, G.J. and S. Raudenbush. 2001. Getting Context Right in Studies of Child Development, in *The Well-Being of Children and Families: Research and Data Needs*. (ed.) A. Thornton. Ann Arbor, MI: University of Michigan Press.
- Duncan, G.J., L.P. Chase-Lansdale. (eds.) 2001. *For Better and for Worse: Welfare Reform and the Well-Being of Children and Families*, New York, NY: Russell Sage.
- Magnuson, K. and Duncan, G.J. "Economics and Parenting" *Parenting: Science and Practice*, Vol. 2, Number 4, October-December, 2002, pp. 437-450.
- Duncan, G.J. 2002. The PSID and Me, in *Landmark Studies of the 20th Century in the US*. (eds.) E. Phelps and F.F. Furstenberg, Jr. New York, NY: Russell Sage.
- Clark-Kauffman, E., Duncan, G.J., and Morris, P. "How Welfare Policies Affect Child and Adolescent Achievement" *American Economic Review - Papers and Proceedings*, Vol. 93, No. 2, May 2003, forthcoming.
- Duncan, G.J. In press. Panel Studies, Uses and Applications, in *International Encyclopedia of the Social and Behavioral Sciences*. (eds.) N. Smelser and P. Baltes. Oxford, England: Elsevier Science.
- Duncan, G. and Magnuson, K. "Parents in Poverty" In Marc Bornstein (ed). *Handbook of Parenting 2nd Edition, Vol. 4: Social Conditions and Applied Parenting*. Mahwah, NJ: Lawrence Erlbaum, 2002, pp. 95-121.
- Duncan, G. and Magnuson, K. "Off With Hollingshead" in Marc H. Bornstein and Robert H. Bradley (eds.) *Socioeconomic Status, Parenting, and Child Development*, Mahwah, NJ: Lawrence Erlbaum, 2002, pp. 83-106.
- Duncan, G. and Magnuson, K. "Individual and Parent-based Intervention Strategies for Promoting Human Capital and Positive Behavior" In P. Lindsay Chase-Lansdale, Kathleen Kiernan and Ruth Friedman, (eds.) *Human Development Across Lives and Generations: The Potential for Change*, Cambridge: Cambridge University Press, forthcoming in 2004.
- Duncan, G. and Magnuson, K. "Promoting the Healthy Development of Young Children" in Isabelle Sawhill (ed.) *One Percent for Kids*, Washington, D.C.: Brookings, 2003, pp. 16-39.
- Duncan, G. and Gibson, C. "Qualitative/Quantitative Synergies in a Random-Assignment Program Evaluation" in Thomas S. Weisner (ed.) *Discovering Successful Pathways In Children's Development: New Methods In The Study Of Childhood And Family Life*, Chicago: University of Chicago Press, forthcoming in 2004.
- Duncan, G., Kalil, A. and Mayer, S. "The Apple Does Not Fall From the Tree" in Melissa Osborne, Samuel Bowles and Herbert Gintis (eds.) *Unequal Chances: Family Background and Economic Success*, New York: Russell Sage, forthcoming.
- Duncan, G. and Magnuson, K. "Parent- vs. Child-Based Intervention Strategies For Promoting Children's Wellbeing" in A. Kalil & T. DeLeire, *Family Investments in Children's Potential Resources and Behaviors that Promote Children's Success*, Monographs in Parenting, forthcoming
- Duncan, G. and Gobson, K. Modeling the Impacts of Child Care Quality on Children's Preschool Cognitive Development" (with the NICHD Early Child Care Research Network). *Child Development*, Vol. 74, No. 5, October 2003, pp. 1454-1475.

Gennetian, L., Duncan, G. Knox, V., Vargas, W., Clark-Kauffman, E. and London, A. "How Welfare Policies Affect Adolescents' School Outcomes: A Synthesis of Evidence from Experimental Studies" *Journal of Research on Adolescence*, Winter, 2004, forthcoming.

Ongoing Research Support

HD 360-38-01A1 (Huston, Aletha) 01/01/03-12/31/06

NIH/NICHD, *Income and Employment Effects on Children and Families*.

The major goals of this project is to assess the 8-year impacts on family functioning and child well-being on the New Hope Project, a 3-year random-assignment experiment designed to test the effectiveness of a multifaceted employment-based anti-poverty program for families who are economically poor. Duncan advises on the design and analysis of the survey.

2 U01 HD30947-10 Duncan (PI) 4/12/99-3/31/05

NIH/NICHD, Family and Child Well-Being Research Network. This research network meets quarterly to carry out its agenda of original research, research conferences and facilitation of government-sponsored research efforts.

NICHD – Duncan (PI) 7/1/03-8/31/04

Subcontract from NBER

Neighborhood Influences on Children's Education: Analysis using the Moving to Opportunity Randomized Experiment. The purpose of this study is to assess the effects of moving out of high-poverty neighborhoods on children's education, and to illuminate the basic mechanisms through which these effects occur.

John D. & Catherine T. MacArthur Foundation (Edin) 3/1/02-6/30/04

The Ford Foundation (Edin)

1/1/03--3/31/05

An Evaluation Study of the New Gautreaux Program. The goal of this study is to understand the benefits and costs to low-income public-housing resident families of being offered a chance to moving to neighborhoods that are predominantly non-black and are generally more affluent. Duncan assists in the design and analysis of the data collected in the study.

Qualitative Study of the MTO Families 3/1/03-6/30/04

in Chicago and Baltimore (Edin, Duncan-PI's)

Russell Sage Foundation (Subcontract from NBER). This study is a qualitative supplement to the evaluation of MTO - a random-assignment experiment that enabled families to move out of high-poverty neighborhoods.

R305T010869/01-Department of Education (Lewis) 10/1/01-9/30/04

Assessing the Educational Consequences of Welfare Reform. Researchers are using data from the Illinois Families Study survey data and school records to assess relationships between welfare reform policies, parental employment, and children's academic outcomes. Duncan advised on the analysis of the collected data.

1 R01 HD39148-01 (Holl) 9/13/00-6/30/05

NIH/NICHD, Research on Child Neglect. The major focus of this study is on the etiology of two specific forms of child neglect: physical neglect and supervisory neglect. Duncan serves as a consultant on design issues.

National Institutes of Health (Shalowitz, PI) 06/01/03-11/30/05

Community Action for Child Health Equity" (CACHE) is a 2.5 year proposal to develop a partnership between Evanston Northwestern Health Care (Northwestern University), the academic site, and the Lake County Health Department, the community partner. The purpose of this cooperative agreement is to study health disparities in perinatal and early childhood outcome, balancing the social, behavioral, biological and environmental contributors to vulnerability.

Daniel C. Edelson

Education

- B.S., Engineering Sciences (Electrical), Yale University, 1985
- Ph.D. program, Computer Science, Yale University, 1988-1989
- Ph.D., Computer Science, Northwestern University (transferred), 1993

Positions and Employment

- 1986-1988 Advances Decision Systems, Research Engineer, Image Understanding Division
- 1992-1994 Project Manager and Software Scientist, Institute for the Learning Sciences and School of Education and Social Policy, Northwestern University
- 1993-1994 Research Assistant Professor, Institute for the Learning Sciences and School of Education and Social Policy, Northwestern University
- 1994-2001 Assistant Professor, Computer Science Department, McCormick School of Engineering and Applied Sciences, Northwestern University
- 1994-2001 Assistant Professor, Learning Sciences Program, School of Education and Social Policy, Northwestern University
- 2001-present Associate Professor, Computer Science Department, McCormick School of Engineering and Applied Sciences, Northwestern University
- 2001-present Associate Professor and Coordinator of Ph.D. Program in the Learning Sciences, Learning Sciences Program, School of Education and Social Policy, Northwestern University

Honors

- Magna Cum Laude, Engineering Sciences, Yale University, 1985

Selected Publications

- Edelson, D. C. (2002). Design research: What we learn when we engage in design. *Journal of the Learning Sciences* (11) (1), 105-121.
- Edelson, D. C. (2001). Learning-For-Use: A Framework for the Design of Technology-Supported Inquiry Activities. *Journal of Research in Science Teaching*, 38 (3), 355-385.
- Edelson, D. C., Gordin, D. N., & Pea, R. D. (1999). Addressing the challenges of inquiry-based learning through technology and curriculum design. *Journal of the Learning Sciences*, 8(3/4), 391-450.
- Edelson, D. C., & Gordin, D. (1998). Visualization for learners: A framework for adapting scientists' tools. *Computers and Geosciences*, 24(7), 607-616.
- Loh, B., Reiser, B.J., Radinsky, J., Edelson, D.C., Gomez, L.G., Marshall, S. (2001). Developing Reflective Inquiry Practices: A Case Study of Software, the Teacher, and Students. In K. Crowley, C. Schunn, & T. Okada, (Eds.), *Designing for Science: Implications from Everyday, Classroom, and Professional Settings*. Mahwah, NJ: Erlbaum.
- Edelson, D. C., Pea, R. D., & Gomez, L. (1996). Constructivism in the collaboratory. In B. G. Wilson (Ed.), *Constructivist learning environments: Case studies in instructional design*, (pp. 151-164). Englewood Cliffs, NJ: Educational Technology Publications.
- Pea, R. D., Gomez, L. M., Edelson, D. C., Fishman, B. J., Gordin, D. N., & O'Neill, D. K. (1997). Science education as driver of cyberspace technology development. In K. C. Cohen (Ed.), *Internet Links for Science Education*, (pp. 189-220). New York: Plenum Press.

Edelson, D. C., & Gordin, D. N. (1996, September). Adapting digital libraries for learners: Accessibility vs. availability. *D-Lib Magazine*, September 1996, <http://www.dlib.org/dlib/september96/09contents.html>.

Schank, R. C., & Edelson, D. C. (1990). A role for AI in education: Using technology to reshape education. *The Journal of Artificial Intelligence and Education*, 1(2).

Ongoing Research Support

National Science Foundation (PI) 3/1/04-11/30/06
My World: A Geographic Information System for Learners

National Science Foundation (PI) 10/1/03-9/30/05
Collaborative Research: THREDDs Second Generation
(Collaborative grant with University Corporation for Atmospheric Research, Ben Domenico, PI; John Caron, Co-PI).

Toyota USA Foundation (PI) 1/1/03-12/31/05
Professional Development and Support for a Technology-Supported Inquiry-Based High School Environmental Science Curriculum

National Science Foundation 10/02-9/07
Centers for Learning and Teaching Program (Co-PI with Reiser)
Center for Curriculum Materials in Science (CCMS)
PI's Subcontract to Association for the Advancement of Science (JoEllen Roseman, PI)

National Science Foundation 9/15/00-8/31/04
Program in Information Technology Research
Learning-Centered Design Methodology: Meeting the Nation's Need for Computational Tools for K-12 Science Education (Engineering Scaffolded Work Environments) (Co-PI)
Elliot Soloway, Mark Guzdial, Andrew Johnson, Daniel Edelson, Joseph Krajcik, Principal Investigators.

Naitonal Science Foundation Edelson (Co-PI with Louis Gomez) 4/1/98-9/31/04
Program in Instructional Materials Development
The WorldWatcher Curriculum: Integrating Visualization into Inquiry-Based Science Learning.

National Science Foundation (PI) 7/15/98-6/30/04
CAREER Program (Research in Educational Policy and Practice)
Learning Science through Design

James E. Rosenbaum

Education

B.A., Culture and Behavior, Yale University, 1969

M.A., Harvard University, 1971

Ph.D., Sociology, Harvard University, 1973

Positions and Employment

1969-1973 Teaching Assistant, Harvard University

1973-1978 Assistant Professor, Yale University

1978-1979 Associate Professor, Department of Sociology, Institution for Social and Policy Studies, School of Organization and Management, Yale University

1979-1985 Associate Professor, Northwestern University

1979-present Faculty Fellow, Institute for Policy Research, Northwestern University

1985-present Professor, School of Education and Social Policy, Northwestern University

Selected Publications

Making Inequality: The Hidden Curriculum of High School Tracking. New York: Wiley, 1976

Career Mobility in a Corporate Hierarchy. New York: Academic Press, 1984

Youth Apprenticeship in America. Washington D.C.: W.T. Grant Commission on Youth and America's Future, 1992.

The Study of a Mixed-Income Housing Program. Loyola University: HRIR, 1996. (with Linda Stroh and Cathy Flynn)

Crossing the Class and Color Lines Chicago: Univ. of Chicago Press, 2000. (with Len Rubinowitz).

Beyond College-for-All: Career Paths for the Forgotten Half. Rose Monograph Series, American Sociological Assn., New York, N.Y.: Russell Sage Foundation. 2001 Received American Sociological Association's Willard Waller Award for Distinguished Scholarship in Sociology of Education.

"Gatekeeping in an Era of More Open Gates" American Journal of Education, August, 1996, 257-279 (with S. Miller and M. Krei)

"Do Employers Really Need More Educated Youth?" Sociology of Education, 1997, Vol. 70, N.1: 68-85 (with Amy Binder)

"Individual Agency and the Life Course: Do Low-SES students get less long-term payoff for their school efforts?" Sociological Focus, 2001, v.24,N.4, 357-376 (with Stefanie Deluca)

"How Can Low-Status Colleges Help Young Adults Gain Access to Better Jobs?: Applications of Human Capital vs. Sociological Models." Spring 2001 Institute for Policy Research Working Papers.

"Are dropout decisions related to safety concerns, social isolation, and teacher disparagement" Dropouts in America ed. Gary Orfield, 2002 (with Stefanie DeLuca).

"Two revolutions in educational attainment research over the past 30 years: Impact on social awareness and policy." Working Paper, IPR. 2002.

"Organizational effects on learning: A conceptual model and research review." Working Paper, Institute for Policy Research. Northwestern University, Spring, 2002.

"Do college for all policies make high school irrelevant?" LSS Spotlight on Student Success, March, 2002.

- "How do places matter? The geography of opportunity, self-efficacy, and a look inside the black box of residential mobility" Housing Studies Vol. 17, No. 1, 2002: 71-82 (with Lisa Reynolds and Stefanie DeLuca).
- "The Unintended Consequences of Stigma-Free Remediation." Sociology of Education, 75 (July) 2002: 249-268..
- "Career and college advice to the Forgotten Half" Teachers' College Record, October, 2001 (w. Melinda Krei)
- "The Social Prerequisites of Success: Can College Structure Reduce the Need for Social Know-How?" in Annals of the American Academy of Political and Social Science. March, 2003: 120-143. (with Regina Deil-Amen)
- "Policies and practices to improve transitions into college and jobs. Professional School Counseling, American school counseling association, vol. 6, No. 4, April, 2003: 252-59 (w. Ann Person)
- T. Kariya and J. Rosenbaum. 2003. Stratified incentives and life course behaviors. In Handbook of the Life Course, ed. J. T. Mortimer and M. J. Shanahan, 51-80. New York: Kluwer Academic/Plenum Publishers.
- "If Low-Income Blacks are Given a Chance to Live in White Neighborhoods, Will They Stay? Examining Mobility Patterns with Quasi-Experimental Data. Housing Policy Debate 2003:305-45. (with S. DeLuca.)
- "Charter-Building at Low-Status Colleges: Charters as Mechanisms of Labor-market Access for Two-year College Students." Sociology of Education (forthcoming, July 2004) (with R. Deil-Amen)
- "It's time to tell the kids: If you don't do well in high school, you won't do well in college (or on the job)." American Educator Spring, 2004, 8-42..
- "Chain enrollment" and college "enclaves": Benefits and drawbacks for Latino college students. Chapter accepted for publication in volume on Latino students in community colleges, edited by Gary Orfield. Person, A. E., & Rosenbaum, J. E. (2004).
- "Student information problems in different college structures." Article accepted by *Teachers College Record*. Person, A. E., & Rosenbaum, J. E. (2004).
- "The Structure of the Life Course in Modern Society: Colleges, Careers, and the Institutional Structuring of the Transition to Adulthood. Chapter accepted for publication in latest volume of *Advances in Life Course Research*, edited by Timothy J. Owens. Person, A. E., Rosenbaum, J. E., & Deil-Amen, R. J. (2004).

Ongoing Research Support

The Spencer Foundation (PI)

06/03 – 05/06

Contacts Between Two-year Colleges and Employers: Impact on Instruction, Guidance and Students

Bruce D. Spencer

Education

B.S., Biometry, Cornell University, 1973
M.S., Statistics, Florida State University, 1974
Ph.D., Statistics, Yale University, 1979

Positions and Experience

1978-1980 Senior Staff Officer and Study Director, Committee on National Statistics, National Academy of Sciences
1982-1985 Sampling Statistician, National Opinion Research Center (NORC), University of Chicago
1984 Visiting Assistant Professor, Department of Statistics and Center for Economic Policy Research, Stanford University
1985-1992 Director of Methodology Research Center, NORC, University of Chicago
1980-1986 Assistant Professor, Department of Statistics, Northwestern University
1986-1992 Associate Professor, Department of Statistics, Northwestern University
1988-1999 Chair, Department of Statistics, Northwestern University
1992-1994 Senior Research Statistician, NORC, University of Chicago
1989-present Member, School of Education and Social Policy, Northwestern University
1992-present Professor, Department of Statistics, Northwestern University
2000-2001 Chair, Department of Statistics, Northwestern University
2000-present Faculty Fellow, Institute for Policy Research (and 1984-1985)

Honors

Palmer O. Johnson Memorial Award from the American Educational Research Association, 1983; Fellow, American Statistical Association, 1992.

Selected Publications

“The Sense and Nonsense of School Effectiveness” *J. Pol. Anal. and Mang.* **1** 43-52, 1981 (with D. E. Wiley).
“Feasibility of Benefit-Cost Analysis of Data Programs” *Eval. Rev.* **6** 649-672, 1982.
“Technical Issues in Allocation Formula Design” *Pub. Admin. Rev.* **42** 524-529, 1982.
“On Interpreting Test Scores as Social Indicators: Statistical Considerations” *J. Ed. Meas.* **20** 317-334, 1983.
“Test Scores as Social Statistics: Comparing Distributions” *J. Ed. Stat.* **8** 249-270, 1983.
“Uncertain Population Forecasting” *J. Am. Stat. Assn.* **80** 306-314, 1985 (with Juha M. Alho).
“Avoiding Bias in Estimates of the Effect of Data Error on Allocations of Public Funds” *Eval. Rev.* **9** 511-518, 1985.
“Optimal Data Quality” *J. Am. Stat. Assn.* **80** 564-573, 1985.
“Statistical Aspects of Equitable Apportionment” *J. Am. Stat. Assn.* **80** 815-822, 1985.
“Test Score Decline: What and How Well Does It Measure?” *Proc. Amer. Stat. Assn, Soc. Stat. Sec.*, pp. 57-64, 1985.
“Sampling Problems in Merging a Cross Sectional and a Longitudinal Program”. Pp. 117-140 in George H. Brown and Elizabeth M. Faupel (editors) *The National Assessment of Educational Progress and the Longitudinal Studies Program; Together or Apart?* Report of a Planning Conference, December 11, 1986. Washington, D.C.: Center for Ed. Stats.
“Effects of Targets and Aggregation on the Propagation of Error in Mortality Forecasts”. *J. Math. Pop. St.* **2** 209-227, 1990 (with Juha M. Alho).

- “Error Models for Official Mortality Forecasts” *J. Am. Stat. Assn.* **85** 609-616, 1990 (with J. M. Alho).
- “Needed Data Expenditure for an Ambiguous Decision Problem” *J. Am. Stat. Assn.* **85** 1099-1104, 1990 (with L. E. Moses).
Spencer, B., Frankel, M., Ingels, S., Rasinski, K., and Tourangeau, R., *Base Year Sample Design Report, National Education Longitudinal Study of 1988*. Washington, D.C.: NCES, 1990.
- “Sampling Probabilities for Aggregations, with Applications to NELS:88 and Other Educational Longitudinal Surveys.” *J. Ed. Stat.* **16** 21-34, 1991 (with W. Foran).
- “Total Error in PES Estimates of Population: The Dress Rehearsal Census of 1988”. *J. Am. Stat. Assn.*, **86**: 839-854, 1991 (with discussion 855-863). (with M. Mulry)
- “A Critique of Sampling in the 1990 Trial State Assessment”. Pp. 1-18 in *Assessing Student Achievement in the States: Background Studies*. Studies for the Evaluation of the NAEP Trial State Assessment Commissioned for the National Academy of Education Panel Report on the 1990 Trial. Stanford: National Academy of Education, 1991.
- “Eligibility/Exclusion Issues in the 1990 Trial State Assessment”. Pp. 19-49 in *Assessing Student Achievement in the States: Background Studies*. Studies for the Evaluation of the NAEP Trial State Assessment Commissioned for the National Academy of Education Panel Report on the 1990 Trial. Stanford: National Academy of Education, 1991.
- “Population Forecasts as a Database” *J. Off. Stat.* **7** 295-310, 1991 (with J. M. Alho).
- “On Comparing Distributions of Poverty Gaps” *Sank., Ser. B*, **54** 114-126, 1992 (with S. Fisher).
- “A Study of Eligibility Exclusions and Sampling: 1992 Trial State Assessment”. Pp. 1-68 in *The Trial State Assessment: Prospects and Realities: Background Studies*. Studies of the National Academy of Education Panel on the Evaluation of the NAEP Trial State Assessment: 1992 Trial State Assessment. Stanford: Nat. Acad. of Education, 1992.
- “Accuracy of the 1990 Census and Undercount Adjustments”, *J. Am. Stat. Assn.* **88** 1080-1091, 1993 (with M. Mulry).
- “Sensitivity of Benefit-Cost Analysis of Data Programs to Monotone Misspecification”. *J. Stat. Plan.* **39** 19-31, 1994.
- “The Practical Specification of the Expected Error of Population Forecasts”, *J. Off. Stat.* **13** 203-226, 1997 (with J.M. Alho).
- “Sampling-Based Adjustment of the 2000 Census – A Balanced Perspective”, *Jurimetrics* **40**, 341-356, 2000 (with Anderson, M., Daponte, B. O., Fienberg, S. E., Kadane, J. B., and Steffey, D. L.).
- “An Approximate Design Effect for Unequal Weighting When Measurements May Correlate with Selection Probabilities”, *Survey Meth.* **26** 137-138, 2000.
Statistical Issues in Allocation Funds by Formula. Panel on Formula Allocations, T. A. Louis, T. B. Jabine, M. Gerstein, eds. Washington, D.C.: Nat. Acad. Pr., 2003. (as Panel member)

Ongoing Research Support

National Science Foundation (PI)
Chicago Regional Data Center

09/01/01 – 08/31/04

The Searle Fund (PI)
Limits of Empirical Social Science for Policy Analysis

09/01/01 – 08/31/04

James P. Spillane

Education

- Baccalaureate, Education and Geography, St. Patrick's College of Education (Ireland), 1984
M.A., Education, California State University, Chico, 1985
Ph.D., Curriculum, Teaching and Educational Policy, Michigan State University, 1993

Positions and Employment

- 1993-1996 Post-doctoral Fellow, Michigan State University
1998-present Faculty Fellow, Institute for Policy Research, Northwestern University
1996-2001 Assistant Professor, School of Education and Social Policy, Northwestern University
2001-present Associate Professor, School of Education and Social Policy, Northwestern University

Honors

- Fullbright Distinguished American Scholar Award, 2003;

Selected Publications

- Spillane, J. (2004). *Standards Deviations: How Local Schools Misunderstand Policy*. Harvard University Press.
- Spillane, J., Hallet, T., & Diamond, J. (2003). Forms of Capital and the Construction of Leadership: Leadership in Urban Elementary Schools. *Sociology of Education*, 76(1).
- Burch, P. & Spillane, J. (2003). School Leaders' Thinking About Instruction: The Subject Matter Context. *Elementary School Journal*.
- Spillane, J. Halverson, R., Diamond, J. (2001). Investigating School Leadership Practice: A Distributed Perspective. *Educational Researcher*, 30(3):23-28.
- Spillane, J. & Zeuli, J. (1999). "Reform and Mathematics Teaching: Exploring Patterns of Practice in the Context of National and State Reforms." *Educational Evaluation and Policy Analysis*, 21(1).
- Spillane, J., Reiser, B. & Reimer, T. (2002). Policy Implementation and Cognition: Reframing and Refocusing Implementation Research. *Review of Educational Research*, 72(3), 387-431.
- Spillane, J. (2002). Local Theories of Teacher Change: The Pedagogy of District Policies and Programs. *Teachers College Record*, 104(3).
- Spillane, J. Diamond, J., Walker, L., Halverson, R., & Jita, L. (2001). Urban School Leadership and Elementary Science Instruction: Identifying, Mobilizing, and Activating Resources in an Under-valued Subject Area. *Journal of Research on Science Teaching*, 38(8), 918-940.
- Spillane, J. (2000). Cognition and Policy Implementation: District Policy-makers and the Reform of Mathematics Education. *Cognition and Instruction*, 18(2), 141-179.
- Spillane, J. (1999). External Reform Initiatives and Teachers' Efforts to Reconstruct Their Practice: The Mediating Role of Teachers' Zones of Enactment. *Journal of Curriculum Studies*, 31(2).

Spillane, J. (1998). "The Progress of Standards-Based Reforms and the Non-Monolithic Nature of the Local School District: Organizational and Professional Considerations." American Educational Research Journal, 35(1).

Ongoing Research Support

National Science Foundation (PI) 9/1/02-9/30/04
The Practice of School Leadership and the Improvement of Mathematics and Science Instruction in Urban Elementary Schools

National Science Foundation (PI) 10/1/03-9/30/04
Developing Distributed Leadership: Understanding the Role of Boundary Tools in Developing and Sustaining Leadership for Learning Networks

Carnegie Corporation of New York (Co-PI with Penelope Peterson) 9/1/03-8/31/04
NU Educational Leadership Collaboratory

Christopher Taber

Education

B.S., Applied Mathematics, University of Chicago, 1989

M.A., Economics, University of Chicago, 1991

Ph.D., Economics, University of Chicago, 1995

Positions and Employment

1995-present Faculty Fellow, Institute for Policy Research, Northwestern University

1995-2001 Assistant Professor, Department of Economics, Northwestern University

2001-present Associate Professor, Department of Economics, Northwestern University

Selected Publications

“Some Effects of Taxes on Schooling and Training,” with W. Dupor, L. Lochner, and M. B. Wittekind, **American Economic Review, Papers and Proceedings**, May 1996.

“What do Bureaucrats Do? The Effects of Performance Standards and Bureaucratic Preferences on Acceptance into the JTPA Program,” with J. Heckman and J. Smith, **Reinventing Government and the Problem of Bureaucracy**, Vol 6, JAI Press Series Advances in the Study of Entrepreneurship, Innovation and Economic Growth, ed. G. Libecap, 1996.

“Alternative Policies for Stimulating the Production of Human Capital,” with J. Heckman, L. Lochner, and J. Smith, **Chicago Policy Review**, Spring 1997.

“Accounting for Dropouts in Evaluations of Social Experiments,” with J. Heckman and J. Smith, **Review of Economics and Statistics**, Jan. 1998.

“The Effects of Government Policies on Human Capital Investment, Unemployment, and Earnings Inequality,” with J. Heckman, L. Lochner, and J. Smith, **Third Public GAAC Symposium-Labor Markets in Germany and the USA**, 1998.

“Explaining Rising Wage Inequality: Explorations with a Dynamic General Equilibrium Model of Labor Earnings With Heterogeneous Agents,” with J. Heckman and L. Lochner, **Review of Economic Dynamics**, January 1998.

“General Equilibrium Treatment Effects: A Study of Tuition Policy,” with J. Heckman and L. Lochner, **American Economic Review, Papers and Proceedings**, May 1998.

“Tax Policy and Human Capital Formation,” with J. Heckman and L. Lochner, **American Economic Review, Papers and Proceedings**, May 1998.

“Human Capital Formation and General Equilibrium Treatment Effects: A study of Tax and Tuition Policy,” with J. Heckman and L. Lochner, in **Fiscal Studies**, 1999.

“Evaluation of Education and Tax Policy in a General Equilibrium Setting,” with J. Heckman and L. Lochner, in **Trade, Development, and Growth: Essays in Honor of T. N. Srinivasan**, Ranis and Raut eds. 1999.

“Wage Progression Among Low Skilled Workers,” with T. Gladden, **Finding Jobs: Work and Welfare Reform**, Card and Blank eds., 2000.

“The College Premium in the Eighties: Return to College or Return to Ability,” **Review of Economic Studies**, July, 2001.

“Semiparametric Reduced Form Estimation of Tuition Subsidies,” with H. Ichimura, **American Economic Review, Papers and Proceedings**, May 2002.

“Tax Reform and Human Capital Accumulation: Evidence from an Empirical General Equilibrium Model of Skill Formation,” **Advances in Economic Analysis & Policy**, Vol. 2: No. 1, Article 3, 2002.

- “Estimation of Educational Borrowing Constraints Using Returns to Schooling,” with S. Cameron, **Journal of Political Economy**, February 2004.
- “Selection on Observed and Unobserved Variables: Assessing the Effectiveness of Catholic Schools,” with J. Altonji and T. Elder, unpublished manuscript, 2003.
- “An Evaluation of Instrumental Variable Strategies for Estimating the Effects of Catholic Schooling,” with J. Altonji and T. Elder, unpublished manuscript, 2004.
- “The Effect of Private School Vouchers on Public School Students through Cream Skimming,” with J. Altonji and C. Huang, June, 2004.

Ongoing Research Support

William T. Grant Foundation

2002-2004

Turnover and Wage Growth in the Transition from School to Work

The transition from school to work is very erratic with many job changes and weak attachment to the labor force. This project tries to establish the extent to which this process is productive job matching leading to wage growth.

The Searle Fund

2002-2004

The Effect of Private School Vouchers on Student Performance

One argument against voucher programs is that the best students in public school will be taken away which will hurt those left behind. This work tries to simulate the extent to which vouchers induce “cream skimming” as well as the impact of this effect on student who remain in public school.

National Science Foundation

2002-2004

Evaluation of Policy Impact

This grant supports a project joint with James Heckman and Lance Lochner on estimation of a general equilibrium model of the U.S. labor market. This model will then be used to simulate the effects of many human capital policies. It also supports a methodological project on improving inference in “difference in differences models.”

David H. Uttal

Education

B.S., Psychology, College of William and Mary, 1983
Ph.D., Psychology (Developmental), University of Michigan, 1989

Positions and Employment

1991-1993 Postdoctoral Fellow, Psychology, University of Illinois
1991-1993 Assistant Professor of Psychology, Virginia Tech
1998 Visiting Scholar, Max Planck Institute for Human Development, Berlin
1993-present Assistant to Associate Professor of Psychology, Northwestern University

Selected Publications

- DeLoache, J.S., Uttal, D. H., & Rosengren, K. S. (2004). Scale errors provide evidence for a perception-action dissociation early in life. *Science*, 304, 1027-1029.
- Uttal, D.H., Gregg, V.H., Tan, L.S., Chamberlin, M.H., & Sines, A. (2001). Connecting the dots: Children's use of a systematic figure to facilitate mapping and search. *Developmental Psychology*, 37, 338-350.
- Uttal, D. H. (2000). Seeing the big picture: Map use and the development of spatial cognition. *Developmental Science*, 3, 247-286.
- Bailenson, J. N., Shum, M. S., & Uttal, D. H. (2000). The initial segment strategy: A heuristic for route selection. *Memory and Cognition*, 28, 306-318.
- Uttal, D. H. (1996). Angles and Distances: Children's Mental Representation of Spatial Information Acquired from Maps. *Child Development*, 67, 2763-2779.
- Uttal, D. H. (2003). On the relation between play and symbolic thought: The case of mathematics manipulatives. In B. Spodek and O. Sarracho (Eds.), *Contemporary perspectives in early childhood education* (pp. 97-114). Greenwich, CT: Information Age Publishing.
- Liu, L. L., & Uttal, D. H. (1999). The interaction of symmetry and familiarity in children's reconstruction of spatial configurations. *Spatial Cognition and Computation*, 1, 111-129.
- Uttal, D. H., Scudder, K. V., & DeLoache, J. S. (1997). Manipulatives as symbols: A new perspective on the use of concrete objects to teach mathematics. *Journal of Applied Developmental Psychology*, 18, 37-54.
- Uttal, D. H., DeLoache, J. S., & Schreiber, J. C. (1995). Waiting to use a symbol: The effects of delay on children's use of models. *Child Development*, 66, 1875-1889.
- Uttal, D. H. (1994). Preschoolers' and Adults' Scale Translation and Reconstruction of Spatial Information Acquired from Maps. *British Journal of Developmental Psychology*, 12, 259-275.

Ongoing Research Support

<i>Institute of Educational Sciences (PI)</i>	2002-2005
<i>U.S. Department of Education</i> <i>Learning from Symbolic Objects</i>	
<i>National Science Foundation</i>	2003-2006
<i>Understanding and Enhancing Spatial Intelligence</i>	
<i>National Science Foundation</i>	2004-2009
<i>Spatial Intelligence and Learning Center</i>	

Sandra R. Waxman

Education

B.S., Occupational Therapy, University of Pennsylvania, 1976

M.A., Psychology, Johns Hopkins University, 1981

Ph.D., Psychology, University of Pennsylvania, 1985

Positions and Employment

1986-1989 Assistant Professor, Department of Psychology, Harvard University

1989-1992 Associate Professor, Department of Psychology, Harvard University

1990-1992 Associate Professor, Graduate School of Education, Harvard University (adjunct appointment)

1992-1997 Associate Professor, Department of Psychology, Northwestern University

1997-present Professor, Department of Psychology, Northwestern University

Honors

American Associate of University Women, Doctoral Fellowship, 1985-1986; The John D. and Catherine T. MacArthur Foundation, Post-Doctoral Fellowship, 1986; The Spencer Foundation and The National Academy of Education, Research Fellowship, 1989; Boyd R. McCandless Young Scientist Nominee, American Psychological Association, Division 7, 1990; Wender-Lewis Research and Training Professorship, Northwestern University, 1994-1996; American Psychological Association, Division 7 Fellow, 1998; Center for Advanced Study in Behavioral Sciences, Nominee, 2000; American Psychological Association, Nominated to be Invited Speaker at Annual Convention, 2002.

Selected Publications

Waxman, Sandra R., & Senghas, Ann (1992). Relations among word meanings in early lexical development. *Developmental Psychology*, 28(5), 862-873.

Hall, D. Geoffrey, & Waxman, Sandra R. (1993). Assumptions about word meaning: Individual and basic-level kinds. *Child Development*, 64, 1550-1570.

Waxman, Sandra R., & Markow, Dana B. (1995). Words as invitations to form categories: Evidence from 12-month-old infants. *Cognitive Psychology*, 29, 257-302.

Waxman, Sandra R., Lynch, Elizabeth B., Casey, K. Lyman, & Baer, Leslie (1997). Setters and samoyeds: The emergence of subordinate level categories as a basis for inductive inference. *Developmental Psychology*, 33(6), 1074-1090.

Waxman, Sandra R., Senghas, Ann, & Benveniste, Susana (1997). A cross-linguistic examination of the noun-category bias: Its existence and specificity in French- and Spanish-speaking preschool-aged children. *Cognitive Psychology*, 43, 183-218.

Waxman, Sandra R., & Namy, Laura (1997). Challenging the notion of thematic bias in young children. *Developmental Psychology*, 33(3), 555-567.

Balaban, Marie T., & Waxman, Sandra R. (1997). Do word labels facilitate categorization in 9-month-old infants? *Journal of Experimental Child Psychology*, 64, 3-26.

Waxman, Sandra R., & Markow, Dana B. (1998). Object properties and object kind: 21-month-old infants' extension of novel adjectives. *Child Development*, 69(5), 1313-1329.

Waxman, Sandra R. (1999). Specifying the scope of 13-month-olds' expectations for novel words. *Cognition*, 70, B35-B50.

Klibanoff, Raquel S., & Waxman, Sandra R. (2000). Basic level object categories support the acquisition of novel adjectives: Evidence from preschool-aged children. *Child Development*, 71(3), 649-659.

- Waxman, Sandra R., & Klibanoff, Raquel S. (2000). The role of comparison in the extension of novel adjectives. *Developmental Psychology*, 36(5), 571-581.
- Waxman, Sandra R., & Booth, Amy E. (2000). Principles that are invoked in the acquisition of words, but not facts. *Cognition*, 77, B33-B43.
- Namy, Laura L., & Waxman, Sandra R. (2000). Naming and exclaiming: Infants' sensitivity to naming contexts. *Journal of Cognition and Development*, 1(4), 405-428.
- Waxman, Sandra R., & Booth, Amy E. (2001). On the insufficiency of domain-general accounts of word-learning: A reply to Bloom and Markson. *Cognition*, 78, 277-279.
- Waxman, Sandra R., & Booth, Amy E. (2001). Seeing pink elephants: Fourteen-month-olds' interpretations of novel nouns and adjectives. *Cognitive Psychology*, 43(3), 217-242.
- Waxman, Sandra R. (2002). Early word learning and conceptual development: Everything had a name, and each name gave birth to a new thought. In U. Goswami (Ed.), *Blackwell Handbook of Childhood Cognitive Development* (pp. 102-126). Oxford UK: Blackwell Publishers.
- Waxman, Sandra R. (2002). Not by perception alone: Conceptual and semantic factors underlying children's extension of novel adjectives. In B. Skarabela, S. Fish, & A. H.-J. Do (Eds.), *Proceedings of the 26th Annual Boston University Conference on Language Development* (pp. 746-757). Somerville, MA: Cascadilla Press.
- Booth, Amy E., & Waxman, Sandra R. (2002). Word learning is 'smart': Evidence that conceptual information effects preschoolers' extension of novel words. *Cognition*, 84(1), B11-B22.
- Booth, Amy E. & Waxman, Sandra R. (2002). Object names and object functions serve as cues to categories for infants. *Developmental Psychology*.
- Waxman, Sandra R. (2002). Links between object categorization and naming: Origins and emergence in human infants. In D. H. Rakison & L. M. Oakes (Eds.), *Early category and concept development: Making sense of the blooming, buzzing confusion*. New York: Oxford University Press.
- Waxman, Sandra R. (in press/under contract). Everything had a name, and each name gave birth to a new thought: Links between early word-learning and conceptual organization. In S. R. Waxman & D. G. Hall (Eds.), *From many strands: Weaving a lexicon*. Cambridge: MIT Press.
- Waxman, Sandra R., & Booth, Amy E. (in press). The origins and evolution of links between word learning and conceptual organization: New evidence from 11-month-olds. *Developmental Science*.

Ongoing Research Support

*National Institute of Child Health
and Human Development (PI)*

04/01/02 – 03/31/07

R01 HD41653-01

Biblical Thought: A Cross-Cultural View

National Science Foundation (Co-PI)

09/1/02 – 08/31/06

A Cross-Cultural View of Biblical Thought

BCS-0132469

**U.S. DEPARTMENT OF EDUCATION
BUDGET INFORMATION
Non-Construction Programs**

Northwestern University

Section C - Itemized Budget Breakdown for Each Project Year

Budget Categories	Project Year 1 (a)		Project Year 2 (b)		Project Year 3 (c)		Project Year 4 (d)		Project Year 5 (e)		Total (f)	
	Fed	Non-Fed	Fed	Non-Fed								
1 Personnel												
A. Key Faculty												
James Spillane, Program Director	22,222	0	24,444	0	26,667	0	0	0	0	0	73,333	0
Greg Duncan, Co-Program Director	0	0	0	0	0	0	41,777	0	43,448	0	85,225	0
Lindsay Chase-Lansdale, Deputy Program Director	13,059	0	0	0	0	0	0	0	0	0	13,059	0
Thomas Cook, Department Coordinator	16,222	0	0	0	0	0	0	0	0	0	16,222	0
Daniel Edelson, Department Coordinator	10,372	0	0	0	0	0	0	0	0	0	10,372	0
Christopher Taber, Department Coordinator	14,907	0	0	0	0	0	0	0	0	0	14,907	0
David Uttal, Department Coordinator	7,800	0	0	0	0	0	0	0	0	0	7,800	0
B. New Faculty Hire	0	0	47,500	0	49,400	0	51,376	0	53,431	0	201,707	0
C. Staff Program Coordinator	22,500	0	23,400	0	24,336	0	25,309	0	26,322	0	121,867	0
Personnel Subtotal	107,082	0	95,344	0	100,403	0	118,462	0	123,201	0	544,492	0
Fringe Benefits	23,665	0	21,453	0	23,394	0	28,431	0	29,568	0	126,511	0
2 Travel												
A. Professional Travel for Training Grant Fellows	12,000	0	30,000	0	48,000	0	54,000	0	36,000	0	180,000	0
B. Travel Funds for Recruitment of Fellows	10,000	0	5,000	0	5,000	0	0	0	0	0	20,000	0
C. Travel Support for Program Director	2,000	0	1,000	0	1,000	0	1,000	0	1,000	0	6,000	0
Travel Subtotal	24,000	0	36,000	0	54,000	0	55,000	0	37,000	0	206,000	0
4 Equipment	0	0	0	0	0	0	0	0	0	0	0	0
5 Supplies	0	0	0	0	0	0	0	0	0	0	0	0
6 Contractual	0	0	0	0	0	0	0	0	0	0	0	0
7 Construction	0	0	0	0	0	0	0	0	0	0	0	0
8 Other	0	0	0	0	0	0	0	0	0	0	0	0
A. Research Fund for Training Grant Fellows	25,000	0	25,000	0	25,000	0	25,000	0	25,000	0	125,000	0
B. NU Hosted Conferences	0	0	0	0	30,000	0	0	0	30,000	0	60,000	0
C. Special Colloquia	16,000	0	16,000	0	16,000	0	16,000	0	16,000	0	80,000	0
Other Subtotal	41,000	0	41,000	0	71,000	0	41,000	0	71,000	0	265,000	0
9 Total Direct Costs (lines 1-8)	195,747	0	193,797	0	248,796	0	242,893	0	260,769	0	1,142,003	0
10 Indirect Costs	15,660	0	15,504	0	19,904	0	19,431	0	20,862	0	91,360	0
11 Training Stipends												
A. Training Grant Fellow Stipend Support	120,000	0	300,000	0	480,000	0	540,000	0	360,000	0	1,800,000	0
B. Training Grant Fellow Tuition Support	42,000	90,552	105,000	242,949	168,000	328,871	189,000	363,404	126,000	212,347	630,000	1,238,123
Training Stipends Subtotal	162,000	90,552	405,000	242,949	648,000	328,871	729,000	363,404	486,000	212,347	2,430,000	1,238,123
12 Total Costs (lines 9-11)	373,407	90,552	614,301	242,949	916,700	328,871	991,325	363,404	767,631	212,347	3,663,363	1,238,123

Northwestern University

Budget Narrative

Budget categories as shown in Section C:

Personnel

Faculty Leadership

Program Directors and Deputy Director. James Spillane and Greg Duncan will both serve as program directors (PD). Dr. Spillane will serve as PD in project years 1-3; Dr. Duncan will serve as PD in years 4 and 5. The two months per year allowable salary support for the PD are budgeted for management purposes. The corresponding percent effort is 22.22%. Lindsay Chase-Lansdale (11.11% effort) will act as deputy program director.

In these designated roles, Dr. Spillane, Dr. Duncan, and Dr. Chase-Lansdale will oversee the recruitment, admissions, and apprenticeship assignment process, organize orientation sessions, plan the seminar series, monitor student progress, and provide steering committee leadership. The program directors will also provide written feedback from the steering committee review process to trainees and their mentors, and they will provide overall stewardship of trainee progress and evaluation.

Departmental Coordinators. Dr. Chase-Lansdale will also serve as one of the five department coordinators. One month of salary (11.11% effort) is budgeted for each of the five department coordinators in project year 1 only. The other four key faculty acting as department coordinators are Thomas Cook, Daniel Edelson, Christopher Taber, and David Uttal.

These five department coordinators will be responsible for the development of new program curricula and will participate in the governance of the training program as steering committee members as described in the training program narrative.

New Faculty Hire

Half the salary of a new faculty member who will be recruited specifically to enhance the breadth and quality of the interdisciplinary-research training program is budgeted. A projected starting salary of \$95,000 is used for the annual base.

Staff Program Coordinator

A professional-level program coordinator will provide logistical and administrative program support. Six months of salary support per year are requested for this staff position. Based on comparable level positions at Northwestern University, the projected base salary for this staff position is \$45,000.

This individual will manage the day-to-day operations of the training program including supporting the activities of trainees, trainee mentors, the steering committee, and the program director; assisting with the recruitment/admission/evaluation processes; acting as a liaison to the NU Graduate School for student advising issues; coordinating the NU-hosted conferences and the various other seminars, workshops, and apprenticeships.

A cost-of-living increase of 4% is included for years 2-5 on all applicable personnel categories.

Fringe Benefits

Employee benefits have been calculated based on the following DHHS approved rates:

9/1/03 - 8/31/04 --- 22.10%

9/1/04 - 8/31/05 --- 22.10% (estimated)

9/1/05 - 8/31/06 --- 22.50% (estimated)

9/1/06 - 8/31/07 --- 23.30% (estimated)

Travel

Professional Travel for Training Grant Fellows

Funds are requested to support fellows' travel to the annual, 2-day IES meeting in Washington, DC. These trips to the annual meeting are budgeted at \$1,000 per fellow per trip. Two additional trips per fellow for travel to professional conferences. Again, \$1,000 per trip is requested.

Travel Funds for Recruitment of Fellows

For recruitment purposes, funds are budgeted for travel for the recruitment of training grant fellows. The first expected recruitment cycle would be winter 2004-05, and so \$10,000 is budgeted to provide travel funds for prospective training grant fellows. After the first cohort is in place, deepening our capacity for other recruitment strategies, the level of funding for recruitment funds is decreased to \$5,000 for years 2 and 3.

Travel Support for Program Director

Lastly, in order for the program director to travel to Washington, DC for the two-day kickoff meeting in the Fall of 2004 and for the five annual IES meetings, \$6,000 total is budgeted (again, at \$1,000 per trip).

Other

Research Fund for Training Grant Fellows

As stipulated in the request for proposals, \$25,000 per year is requested to support the day-to-day research activities of the fellows. Taped interview transcriptions, incidental research-related equipment, special software purchases, reimbursement for travel to research sites are all examples of likely costs to be supported by the IES training grant research fund for fellows.

NU Hosted Conferences

\$30,000 is budgeted in years 3 and 5 for two major conferences to be hosted at Northwestern University. It is expected that the IES funds, besides providing for standard conference costs, would also allow for the leveraging of additional funds to be raised in order to commission conference papers and to include a larger number of attendees. The two conferences would each be two-day events and would include 12 paper presentations. The funds budgeted would allow for two-day travel and per diem for 12 authors, 5 co-authors, plus 8 out of 12 panel discussants who would be attending from outside the Chicago area. Each conference day would include a luncheon for all attendees; the invited authors and discussants would also receive a dinner reimbursement for the intervening evening. The following table displays estimated IES costs planned for each of these events:

		<u>Authors</u>	<u>Co-authors</u>	<u>Discussants</u>	<u>All Attendees</u>	<u>Total</u>
		(12)	(5)	(8)	(150)	--
Travel/per diem	\$1,000	\$12,000	\$5,000	\$8,000	--	\$25,000
Night 1 dinner	\$30	\$360	\$150	\$240	--	\$750
Luncheons (2)	\$12.50	--	--	--	\$3,570	\$3,750
Materials	--	--	--	--	\$500	\$500
Total	--	\$12,360	\$5,150	\$8,240	\$4,250	\$30,000

Special Colloquia

During each academic-year quarter (3 per year, 15 quarters total), two of the five planned biweekly seminars will include a prominent speaker from outside Northwestern. In each year therefore, travel and subsistence funds are budgeted for six outside researchers per year at \$2,000 per visitor. In each year, it is also expected that two additional prominent scholars from outside Northwestern University will visit for the purpose of meeting with resident IES core and affiliated faculty to lend expertise in the development of new interdisciplinary research. \$2,000 per trip to NU is budgeted for these visitors also. Altogether, \$16,000 per year is allocated for these activities.

Indirect Costs

In accordance with U.S. Department of Education policy for training grants, the request for indirect cost reimbursement is limited to 8% of the total direct costs less fellow stipends and tuition.

Training Stipends

Training Grant Fellow Stipend Support

The full allowable stipend level of \$30,000 per year per fellow for all five years is budgeted. As detailed in the training program narrative, a total of 22 graduate student fellows will be supported over the course of the program's five years. Four students would enter the program during the program's first year; six students would enter in each of the program's second through fourth years. Students would typically enter the program at the beginning of their second year of

graduate study and engage in training and mentoring activities in the second through fourth years of their graduate training. In this way, the projected number of active students per year is 4, 10, 16, 18, and 12.

Training Grant Fellow Tuition Support

The maximum allowable cost-of-education allowance of \$10,500 per year per fellow is requested and will be applied toward the cost of Northwestern University doctoral student regular tuition costs. Again, the projected number of active students per year is 4, 10, 16, 18, and 12.

NON-FEDERAL FUNDS

Given that the cost-of-education allowance described above falls substantially short of the actual cost of doctoral student tuition at Northwestern University, the University's Graduate School has committed a total of (b)(4) in order to provide the full fellowship funding package necessary to carry out the aims of the proposed training grant at this institution.

For academic year 2003-2004, doctoral program annual tuition for full-time registration is \$31,560. It is assumed that training grant fellows in their fourth year of study will have completed their course work and will thus qualify for resident-level tuition, which, in 2003-2004, costs \$3,156/quarter. A tuition rate increase of 5% is projected for the purpose of estimating tuition costs beyond 2003-2004.

Appendix C.3. Faculty Affiliates with Current Support

PI	Title of Program	Funding Source	ID #	Project Period	Total Award
(b)(6)	Everyday Experiences, Physiological Stress, and the Emergence of Affective Disorder over the Transition to Early Adulthood	William T. Grant Foundation		9/04-8/09	\$287,198
	National Academy of Education/Spencer Postdoctoral Fellowship: Adolescent Cortisol Activity in Home, School, and Peer	NAE/Spencer Foundation	Letter 8/15/03	9/03-8/04	\$50,000
	Analogical Learning and Case-Based Instruction	ONR	N00014-02-1-0078	11/01-11/04	\$740,639
	Understanding and Teaching Spatial Competence	National Science Foundation (U of C)	27010NW/REC-0337360	12/03-11/06	\$450,863
	The 26th Annual Conference of the Cognitive Science Society	ONR	N00014-04-1-0150	12/03-9/04	\$10,000
	Building an Infrastructure for Generative and Sustained Change in Science Instruction in Urban Schools	National Science Foundation	REC-0128949	3/02-11/04	\$1,400,000
	Illinois Professional Learners Partnership	Illinois State University	RSP00A059/P336B990042	10/99-9/04	\$300,000
	MacArthur Technology Initiative: Research Network on Teaching and Learning	MacArthur Foundation	A02/01-70734-HCD	3/02-8/04	\$225,664
	A Case Study of Design, Implementation, and User Testing in K12 Science Education	National Science Foundation	F003965	9/00-8/04	\$462,805
	The WorldWatcher Curriculum	National Science Foundation	ESI-9720687	4/98-9/04	\$1,874,834
	Center for Curriculum Materials in Science	National Science Foundation	ESI-0227557	10/02-12/07	\$2,497,383
	An intensive study of mentoring Relationships in Urban Boys and Girls Clubs	William T. Grant Foundation	2278	7/02-6/04	\$293,988
	Improve Workforce Development Information systems in Illinois	Joyce Foundation	Letter 4/23/03	5/03-6/04	\$20,000
	Illinois Families Study	Polk Brothers Foundation	Letter 5/13/03	5/03-4/05	\$50,000
	Illinois Family Study - Award 27868	Chicago Community Trust	C2003-00046	10/03-9/04	\$135,000
	Illinos Family Study -Award 28632	MacArthur Foundation	03-73556-000-HCD	8/03-7/04	\$250,000
	Illinois Families Study	Joyce Foundation	25539	1/03-12/04	\$250,000
	Assessing the Educational Consequences of Welfare Reform	U.S. Department of Education	R305T010869/02	10/01-9/04	\$818,365
	Chicago Housing Authority & Community Inclusion Project	Chicago Community Trust	C2001-00433	9/01-9/04	\$200,000
	Illinois Families Study: Child Well-Being	National Institute of Child Health and Human Development	4R01 HD039148	09/00-6/05	\$968,023
	Biological Thought: A Cross-Cultural View	National Science Foundation	BCS-0132469	9/02 - 8/06	\$542,449
	Categorization and Reasoning Among Expert Populations	National Science Foundation	BCS-9983260	6/00 -- 5/05	\$331,416
	The Cultural Context of Learning: Native American Science Education	The Spencer Foundation	Grant #200300137	2/03 - 9/04	\$50,000
	Categorization and Reasoning across Culture and Expertise	NIH		9/04 - 8/08	\$590,581
	Biological Thought: A Cross-Cultural View	National Institute of Child Health and Human Development	5 R01 HD041653-03	4/02 - 3/07	\$1,407,043
	NU Educational Leadership Collaboratory	Carnegie Corp of New York	B7615	9/03-8/04	\$273,800
	Developing Distributed Leadership	National Science Foundation	EHR-0335429	10/03-9/04	\$268,620
	A Sociolinguistic Investigation of an Ethnolinguistic Boundary	National Science Foundation	BCS-0214216/002	8/02-7/05	\$21,919
	Conceptual Dynamics in Complex Science Interventions	National Science Foundation	REC-0092648	4/01-3/06	\$581,711
	Middle School Science Curriculum Materials	National Science Foundation	ESI0101780	8/01-7/04	\$591,652
	Center for Curriculum Materials in Science	National Science Foundation	ESI-0227557	10/02-12/07	\$2,497,383

Appendix D: Required and Optional Courses

(Training grant faculty names are listed if they teach the given course)

Statistics

Required

- Basic Statistics I & II (STAT 330:1 and 2), *or* Analysis of Social Data: Statistics and Methods (SOC 401: 1 and 2), *or* Fundamentals of Statistics (PSYCH 450), and Linear Models: Correlation and Regression (PSYCH 453): *All of these courses provide a basic introduction to hypothesis testing, analysis of variance and simple regressions models.*
- Longitudinal methods (HDSP 463—Duncan, *or* SOC 402) *provide hands-on applications of regression-based approaches to longitudinal models, including event-history modeling*
- Hierarchical Linear Models (HDSP 471—Konstantopolous): *Theory and applications course on Hierarchical Linear Models.*

Optional

Survey Sampling (STAT 325—Spencer): *Probability sampling, stratification, cluster sample, nonsampling errors and their implications for regression estimation.*

Intermediate Econometrics (ECON 381: 1 and 2—Taber [at advanced undergraduate level]): *Econometric sequence, including theory and applications.*

Introduction to Econometrics (ECON 480: 1, 2, 3 at graduate level): *Graduate-level econometric theory classes*

Statistical Demography and Forecasting (STAT 345—Spencer): *Provides a self-contained introduction to the statistical theory of demographic rates in a multistate setting, while developing some simple statistical models that underlie most of classical formal demography and that can also be used in estimating the ex ante uncertainty of multistate demographic forecasts*

Evaluation

Required

- Theories of Evaluation (SOC 476—T. Cook). *Overview of the logic of evaluation and how it is instantiated as evaluation practice in various disciplines, especially education.*
- Designs for Descriptive Causal Research in Field Settings (SOC 404—T. Cook): *Theories of causation and an analysis of how various experimental and nonexperimental research designs promote causal inference.*
- Psychometric Theory (PSYCH 405): *Introduction to the theory of measurement, reliability, validity, and scale construction.*
- Qualitative Research Methods (HDSP 432 - Spillane; ANTHRO 389; SOC 403): *Graduate-level introductory courses to qualitative methods with applications to formative and implementation evaluation stages.*

Optional

Implementing Random Assignment (new course in SOC—T. Cook): *a survey course covering both theory and practical aspects of implementing random assignment evaluations with students, classrooms or schools as the unit of assignment.*

Meta-analysis (Quantitative Syntheses of Research (PSYCH 455): *Overview of meta-analytic approaches to synthesizing research literatures*

Social Program Evaluation (HDSP 451): *Strengths and weaknesses of experimental designs, cost/benefit analysis.*

Dissemination and Utilization of Scientific Knowledge and Evaluations, (HDSP new course - Fay Cook). *Overview of how research is disseminated and used by policymakers at the Federal, State and local levels.*

Advanced Qualitative Methods (Spillane) *The course on analyzing qualitative data to develop and justify assertions; epistemological underpinnings of various approaches to qualitative research, and issues of reliability, validity, and making generalizations in qualitative work.*

Statistics in Experimental Design (PSYCH 451): *Design and analysis of experiments, with an emphasis on analysis of variance technique.*

Observational Methods for the Study of Human Development (HDSP 451 - Adam): *Project-based course on systematic observational coding of behavior, including design of observational coding schemes and calculation of interobserver reliability statistics.*

Methods in Human Biology Research (ANTHRO 386): *A laboratory-based introduction to research in human biology and health.*

Learning and Cognition

Required

- Child Development (HDSP 402 or its equivalent—Chase-Lansdale): *Major theories and current empirical research concerning cognitive and social/emotional development of children*
- Learning In Context: Cognitive Science Foundations of the Learning Sciences (LS 210-403—Ortony & Peterson). *Cognitive and social science theories of how people learn to understand, reason and solve problems. Implications for the design of classroom learning environments; learning in real contexts as critical scenarios for investigating central issues in cognitive science, e.g., knowledge representation, expertise transfer and metacognition.*
- Cognitive Development (PSYCH 462— Uttal and Waxman): *Development of cognitive structures and processes, including learning, memory, reasoning, language and conceptual systems.*

Optional

Analogy and Similarity (PSYCH 466 – Gentner) *Psychology of comparison, including theories of similarity, analogy and metaphor in psychology and artificial intelligence; processes of transfer,*

comparison in decision making; analogy in mental models and folk theories; and development of analogy and similarity.

Culture, Language, and Cognition (PSYCH 467 - Medin) *Survey of theory, data, and methods in cultural research on language and cognition. Focus is on empirical research and its relation to cognitive psychology.*

Knowledge Representation for the Learning Sciences, (LS-401 – Sherin) *is designed to be an introductory course on cognition, introducing basic notions (representation, process, etc.) as applied to subject matter domains such as science, math, and history. Also, the latter parts of the course focus on issues of learning, explored within subject matter domains.*

Culture, Health, and Human Development (ANTHRO 490): *Draws on concepts and methods from anthropology, psychology, public health, and human biology to provide an integrated view of human development and health as products of biological, socio-ecological, and, especially, cultural processes.*

Adolescent Development (HDSP 403—Hirsch): *Biological, cognitive, and social development during adolescence, including social policies and institutions that affect the well-being of adolescents.*

Theories of Human Development (HDSP 413): *Biological bases and interactions with the social and physical environment as sources of social, emotional, and cognitive aspects of human development.*

Cognitive and Clinical Psychology (PSYCH 472): *Survey of recent literature relative human psychological phenomena to noninvasively recorded physiological events.*

Theories in Social Psychology (PSYCH 481): *Introductory overview of social psychology*

Understanding the Person (HDSP 415): *Psychological ways to comprehend persons in social and historical context. Personality functioning, dynamics and adjustment from various perspectives.*

Adult Development and Aging (HDSP 404): *Concepts, theories, and research on development and adaptation from early adulthood through aging.*

Socialization (ANTHRO 376): *Cross-cultural study of the intergenerational transmission of culture; processes by which social groups pass on social tradition.*

Nature/Nuture Revisited: Effects of Experience on Biology (HDSP 451—Adam): *Environmental influences on biological development, such as social influences on brain development, stress hormones, immune functioning, and physical health.*

Development of African-American Children and Families: Theory and Practice (HDSP 312—Mandara): *Reviews recent literature on African-American families.*

Culture and Cognition (PSYCH 460—Waxman): *Role of culture in cognitive processes*

Education Policy

Required

- Economics of Education (ECON 397 - Taber) *An introduction to economic approaches to a variety of education policy topics. Some students will precede this course with: Economics of Public Policy (HDSP 430—Duncan), or an equivalent intermediate microeconomic theory class: Provides intermediate-level training in microeconomic theory, with a focus on household behavior, market equilibrium and cost-benefit analysis.*

- Education Policy and Classroom Learning: Choice, Charters, & Standards (HDSP - Spillane) *provides students with an introduction to different policy options in education and their relationship to the technical core of schooling – teaching and learning.*
- Sociology of Education (HDSP 427—Rosenbaum): *Overview of sociological approaches to education research and policy.*

Optional

Design of Learning Environments. (LS 429, Edelson, Reiser, Gomez). *This course is an introduction to issues in the design, enactment, and study of innovative learning environments.*

Schools as Organizations and School Reform (HDSP new course Spillane) *will introduce students to organizational theory as it relates to schools and get students to apply this theory to the implementation of particular Comprehensive School Reform Designs (CSRs).*

Poverty and Public Policy (HDSP 434—Duncan): *Reading course for overview of research on poverty and on policy approaches to poverty.*

Social Policy: The Implementation Process (HDSP 451): *Explores the implementation process from multiple perspectives including policy design, organizational and inter-organizational, street level bureaucrats and target group behavior, and cognitive perspectives*

The Politics of Public Policy (HDSP 440—F. Cook): *Framework for understanding the structure and process of policy development.*

Modern Theories of the State and Social Policy (HDSP 433—Lewis): *Recent theories of social policy in the context of the welfare state.*

Local Public Sector: Policies and Business Implications (MGMT 932—McGuire): *Applied macroeconomics on role of state-local governments in a market economy and impact of fiscal policies on business.*