Individual and Parent-based Intervention Strategies for Promoting Human Capital and Positive Behavior

Greg J. Duncan
Northwestern University

Katherine Magnuson
Columbia University

We are grateful to the Family and Child Well-being Research Network of the National Institute of Child Health and Human Development (2 U01 HD30947-07) for supporting this research and for helpful comments from Hans Bos, Felix Buechel, Avshalom Caspi, P. Lindsay Chase-Lansdale, Tom Cook, Robert Granger, Emma Adams, Michael Rutter and Hiro Yoshikawa.

Individual and Parent-based Intervention Strategies for Promoting Human Capital and Positive Behavior

1. INTRODUCTION

The process of human development provides abundant avenues for interventions aimed at promoting healthy development. We focus our chapter on interventions designed to augment human capital and promote positive behavior, particularly for individuals raised in economically disadvantaged families. Human capital consists of skills acquired in both formal and informal ways that have value either in the labor market (Becker, 1975) or at home (Michael, 1974, 1982). Formal schooling is the most familiar and studied form of human capital. Since it produces both pecuniary rewards in the labor market as well as other important competencies, human capital is one of most important components of healthy development.

Completed schooling is a strong predictor of successful adult outcomes such as longevity, career attainments, and avoiding crime (Fuchs, 1983), as well as such two-generation outcomes as successful parenting (Hoff-Ginsberg and Tardiff, 1995). Nevertheless, researchers have long worried about the potentially spurious nature of these associations. Are they truly the result of the schooling, or do they instead reflect the greater ability or motivation that leads some to complete more schooling? The most sophisticated studies strongly suggest causal impacts of schooling on earnings as well as other positive outcomes, with the apparent social rate of return to investing in additional years of schooling averaging around 10% (Card, 1999). Roughly speaking, this means that investing $10 in interventions that successfully promote the attainment of an addition year of schooling (a difficult task – see below) produce a $1 annual increment to participants' earnings. As we shall see in our review below, few alternative ways of spending $10 are likely to yield such a return.

The scope of human capital interventions we consider is quite broad, including those in early and middle childhood, adolescence as well as early adulthood. We consider intervention programs that target individuals directly as well as programs targeting parents and family environments.

We begin in Section II with a review of the economic and developmental logic of interventions. Drawing from both developmental and economic theory, we develop expectations regarding the "profitability" of intervention programs designed to promote human capital development at different point in life. Economic logic generally supports the view that interventions early in life are likely to be the most profitable, while developmental logic provides a similar set of predictions about the efficacy of interventions at different points in the life course.

We then review the empirical literature on the efficacy of actual interventions that have been targeted at children, adolescents, adults and families. We review the literature on individual-focused human capital interventions in Section III. In Section IV, we review parent-based programs, including both direct parenting interventions and policies directed at increasing parental resources such as income and education. Our conclusions are presented in Section V.

2. INTERVENTIONS THAT ENHANCE DEVELOPMENT

2.1 Interventions across the life course

Our review of interventions aimed at promoting human capital includes both individual and parent-based strategies. Individual interventions focus directly on the person whose development is targeted, and can occur very early in life, as with intensive pre-school education; in middle childhood, as with improving the quality of instruction in schools; in adolescence, as with school-based vocational education and after-school mentoring programs; in early adulthood, as with school-to-work vocational training programs; and even in middle age, as with retraining programs focused on promoting second careers. These kinds of interventions are shown in the right half of Figure 1.

Parent-based strategies focus on enhancing the skills or economic resources of parents in hopes that parents will better teach, nurture or in other ways provide for their children and in so doing enhance their children's well-being. Examples depicted in the left half of Figure 1 include home visitation and job training programs for new mothers, but also the vast array of tax and transfer policies aimed at redistributing incomes from rich to poor families. Income redistribution is motivated in many other ways of course, but it is useful to consider whether increasing the incomes of poor families promotes their children's development. If so, policymakers attempting to promote positive developmental outcomes should consider public spending on transfer policies as complements or possibly substitutes for more direct parent- or child-based programs they might fund.

The distinction between individual and parent-based programs is not always clear. Some welfare-to-work programs in the United States rely on such human capital strategies as enrolling mothers in adult basic and vocational education programs. Successful completion of skill-building training programs may either enhance a mother's own labor-market prospects (an individual strategy) or improve her ability to prepare her children for the transition to school (a parent-based process), or both. In addition, some early interventions "treat" both the child and the parent at the same time. But most programs fit neatly into the individual vs. parent-based dichotomy.

Several other kinds of interventions are included in neither Figure 1 nor in our chapter. Our focus on interventions that target human capital and positive behavior excludes health-oriented interventions, including public health campaigns. While important and, in some cases, highly effective, these interventions are too numerous and diverse for our chapter. Second, we do not consider strategies that combine interventions that we review. For example, it may be that early education programs are much more effective when combined with an economic intervention that ensures an adequate living standard for targeted families.

Third, we do not consider larger structural changes that may facilitate the development of human capabilities or enhance the effectiveness of the interventions we do consider. A full-employment economy, universal health care, universal *écoles maternelles*, and absence of racial, ethnic or gender discrimination are examples of such facilitative structural conditions.

2.2 An economic framework for intervention research

In thinking about the diverse array of individual and parent-based intervention strategies, it is helpful to be reminded of the economic framework behind optimal choices among such interventions. An important source of tension between developmental science and the policy

economics of intervention programs lies in the fact that science often addresses the question of "what works?" and "how does it work?" while budget-constrained policymakers and practitioners seek evidence on real-world programs with the "biggest bang for the buck." In attempting to establish whether intervention programs might indeed produce longest-lasting impacts, developmentalists often design very expensive "efficacy" interventions, with annual per-participant costs exceeding $10,000 and the quality of the intervention is much higher than what is possible in a "scaled up" national or regional program.

Legislators' and practitioners' budgets are often too small to offer such programs to more than a small fraction of the individuals who would profit from them. It is not enough to demonstrate a convincing causal linkage between factor A and outcomes B and C; informed policy requires knowledge of the costs of a feasible large-scale program that changes A and the value of benefits associated with the resulting change in outcomes B and C. We agree with Shadish et al. (2002) when they argue that policy decisions require that "efficacy" trials be followed by "effectiveness" trials in which interventions are implemented in a variety of real world settings and with the realistic levels of quality.

How big an impact must an intervention program produce to be worthwhile? Is a cheaper-by-half, scaled-back version of a proven but very expensive program likely to provide at least half the benefits of the proven program? If several interventions have proven benefits but a decision-maker cannot fund all of them, how should she choose among the alternatives? Is it better to concentrate limited resources on expensive programs for relatively few children or on cheaper, but more universal programs? These are some of the difficult policy questions that arise with intervention programs.

Cost-benefit frameworks (Levin, 1983; Gramlich, 1990) provide a way of addressing all of these issues. Key is a systematic assessment of the costs and benefits of an intervention program, based on a careful (ideally random-assignment) comparison of outcomes for the children or adults offered the program services and otherwise similar children or adults not offered program services. When both costs and benefits can be quantified, a cost-benefit accounting can produce an estimate of a program's "rate of return" – the return on the amount invested in the intervention.

Economists distinguish costs and returns that accrue to participants in the interventions and to taxpayers who usually pay the bulk of program costs. We focus on the social costs, benefits and rate of return, which sum the participant and taxpayer components. Thus, we seek to compare the total time and money costs of an intervention, regardless of how these costs fall on participants and taxpayers. And we focus on the total benefits produced by the intervention, regardless of how many of these benefits are enjoyed by the participant and taxpayer. The social rate of return is based on a comparison of these total benefits and costs.

The social rate of return to an intervention is akin to the rate of return calculated by a private business on its investment possibilities. When positive, social benefits exceed social costs and it makes sense to consider public funding for such a program. When the social rate of return is negative, benefits fall short of costs, suggesting that the public's money is better spent in other ways or returned to taxpayers for their own private consumption (including their private investments in their own children).

Lest readers be put off by the hard-hearted nature of these considerations, we hasten to note that it is often difficult to assign monetary values to important components of program

benefits. That said, however, we stress the importance of the logic of economic thinking about interventions. Like it or not, public resources for interventions are limited, and funding one program often precludes funding another one. Informed policy requires a rigorous framework for judging among competing programs, and the cost-benefit analysis provides precisely such a framework.[1]

But what adult and child impacts should be measured and how should we assign a dollar value to them? In the case of youth and adult skill-augmenting programs, labor market employment and earnings are the obvious outcomes and fit nicely into our focus on human capital outcomes. IQ and school achievement are a common focus for intervention programs directed at young children. But while IQ gains may benefit society by increasing the productivity of the nation's workforce, a careful cost-benefit evaluation of the High/Scope Perry Preschool program (Schweinhart et al., 1993) demonstrated that the value to society of improvements in children's mental or physical health, or reductions in such problem behavior as criminal activity, can easily exceed the value of the IQ-based productivity gains. As a result, we consider early intervention program impacts on both human capital and positive behavior.

2.3 The likely life-cycle profile of the social profitability of interventions

The menu of possible adult and child interventions is formidable. Before diving into some details about them, it is useful to think about whether the social profitability of interventions is likely to differ systematically across the life course (Brim and Phillips, 1988). There are good, but competing, reasons to suspect that it may differ.

Heckman (1999) provides a useful framework for considering the efficacy of social investments in skill-augmenting or behavior-improving interventions at various points in the life cycle. Figure 2 illustrates two possible patterns of the profitability of investments. In the case of A, the profitability of social interventions is positive and roughly constant throughout life. In the case of B, the social rate of return to interventions early in life is very high but then declines to zero and below by the end of adolescence. Which of these two patterns of social profitability, or perhaps of the many others that we could have drawn, is suggested by economic and developmental theory? The answer is crucial, since public investments in human capital interventions should be channeled toward developmental stages that produce the highest social rates of return.

2.3.1 Economic considerations. The economic study of human "investment" flowered in the 1960s with Becker's Human Capital and related work by T.W. Schultz (e.g., Schultz, 1961). Formal education was a prominent focus of this work, with the time and money spent on acquiring additional schooling viewed as the "cost" of the human capital investment and the increment in lifetime earnings occasioned by the added schooling viewed as the chief benefit. The analytic power of being able to apply the economic framework of investment in "physical"

[1] Of course, the cost-benefit perspective is not the only one that figures into public decision making. In actual decision making, political considerations often dominate both rational and ethical arguments (Lindblom, 1980). We acknowledge these possibilities but concentrate our review on the empirical evidence gathered from rigorous program evaluations.

capital such as factory machines to human capital investments such as education quickly overcame ethical objections to viewing human capacities in a cold-hearted economic framework.

Becker (1975), Mincer (1973) and Ben-Porath (1967) extended the scope of the investment model to include other adult investments such as on-the-job training. They reasoned that individuals confronted with choices regarding human capital investments at different stages in life would consider the costs and benefits of the options. Investment costs include tuition payments but more importantly the cost of time spent acquiring the human capital. These latter costs are most easily seen in the case of formal schooling, where students devote considerable time to their studies and often forego substantial opportunities to earn money while doing so.

Economic logic suggests that later-in-life investments in on-the-job training are not likely to be very profitable. On the cost side, trainees are taking time from productive activities in order to obtain the training. Since productivity and earnings typically increase as adults age, the time costs of human capital investments increase as well, and render later-in-life investments more costly than early-in-life ones. Benefits from later-in-life training are also likely to be lower, since the number of years over which benefits can be reaped (i.e., between the point of investment and retirement) falls. The combination of rising costs and falling benefits produce a prediction that the volume of self- or employer-initiated investment will fall with age. It suggests that the social profitability of public human capital interventions may decline with age as well.

The investment framework is easily extended to include human capital investments in childhood. As with on-the-job training, at least some economic logic suggests that "younger is better" – i.e., interventions focused on children may be more profitable than interventions focused on adults. The "opportunity cost" of participants' time is effectively zero for children, and the period of time over which investment benefits can be reaped is large.

An additional economic consideration is whether the productivity of interventions differs systematically across life or among same-aged individuals. In economic jargon, this question centers on the nature of an intervention's "production function" – i.e., the relationship between the "inputs" that participants and program designers bring to the intervention and the developmental "outputs" that may be enhanced as a result. One worry along these lines is whether the impacts of some short-term investments "fade out" if attempted too early in life. For example, the large cognitive gains produced by the Perry Preschool Program disappear by third grade, although other differences persisted until at least 27 years after the program ended (Schweinhart et al., 1993).

A related issue is whether programs work best for participants with relatively low vs. higher levels of skills, health or social development. For example, the summary of welfare-to-work experiments by Gueron and Pauly (1991) concluded that the programs generated the highest social "profit" for long-term welfare recipients. But other evidence suggests the opposite is more common - that "skill begets skill" – with larger gains for individuals with skills, health and behavior above some minimum threshold (e.g., Heckman, 1999; McCarton et al., 1997). To the extent that "skill begets skill," interventions earlier in life take on added importance, since they can help ensure that children attain competencies needed to profit from opportunities later in life.

Finally, a different kind of economic logic suggests that the indirect nature of parent-based interventions may render them less effective than individual strategies. Parent-based interventions presume that better-trained or higher-income parents will educate, parent or

purchase beneficial goods and services for their children. A parent-based approach assumes that parental behavior has a strong influence on children's healthy development and that positive parenting can be learned or, in the case of economic interventions, improved by increases in economic resources. Both of these assertions are controversial. Even if children benefit from changes in parent-child interaction patterns or in the quality of their home learning environments, the success of parent-based interventions is premised on the ability of interventions to improve parents' behavior in cost-effective ways. The literature we review suggests that effecting change in parents through parenting programs is indeed possible, although more difficult than previously thought.

2.3.2 Developmental considerations. Principles of developmental science suggest that although beneficial changes are possible at any point in life, interventions early on may be more effective at promoting well being and competencies compared with interventions undertaken later in life. General models of development predict substantial continuity in development across the life course, although the extent of continuity differs depending on the domain under consideration. We argue below that the processes that produce continuity are likely to decrease the efficacy of later interventions. We emphasize continuity in developmental *trajectories*, or behavioral patterns, because the preservation of behavior across the life course is only achieved through processes of development and change (Cairns & Rodkin, 1998; Magnusson, 1998). For example, academic success in elementary school involves a different set of skills than academic success in high school.

Many view the debate about whether nature or nurture plays a more prominent role in development as outmoded and unproductive (Baltes, 1997; Bronfenbrenner & Morris, 1998; Rutter, 2000; Sameroff, 2000; Shonkoff and Phillips, 2000). Developmental outcomes and trajectories result from processes of individual adaptation involving genetic and environmental influences, as well as the ongoing two-way interactions between the individual and the environment (Bronfenbrenner & Morris, 1998; Kagan, 1979; Magnusson, 1998; Sameroff, 2000; Sameroff and Fiese, 1990).[2] By viewing the individual as the unit of development, theory emphasizes that individuals develop holistically. Cognitive, affective, biological, and behavioral domains are systematically interdependent and mutually influencing. Each stage of development requires the reorganization of existing capacities, as well as the acquisition of new capacities. By emphasizing the adaptational aspects of development, theory suggests that there are multiple, but finite, ways to functionally organize an individual's developmental resources (Cairns and Rodkin, 1998; Magnusson and Stattin, 1997; Masten and Curtis, 2000). That is, there is more than one pathway to a given outcome.

Despite the multi-determined nature and seeming complexity of development, theory suggests that developmental trajectories demonstrate predictable continuity (Cairns and Rodkin, 1998; Magnusson, 1998). This continuity is due not only to constancy in individual and

[2] Dickens and Flynn (2001) present an interesting model of the role of heredity and environment in affecting cognitive development. They argue for a very powerful potential role for both environment and heredity. They suggest that the dynamic nature of interactions between phenotypic characteristics and the environment may mask, multiply or average environmental effects. They also warn that in the absence of sustained environmental changes, heredity induces the "fade-out" of intervention effects. When coupled with consensus estimates of the substantial degree of heredity in cognitive development, their model suggests that we should not expect short-term early childhood interventions to produce many long-term cognitive benefits.

environmental characteristics over the life course, but also to the two-way "transactional" nature of development. As they age, individuals transform their environments by differentially selecting, interpreting, and attaching meaning to their experiences (Magnusson, 1998). Conversely, environments can also transform individuals by providing opportunities for growth and demanding new behavior. Through this process of mutual change, developmental theory suggests individuals and their environmental contexts become correlated (Cairns and Rodkin, 1998). In this view, developmental trajectories demonstrate continuity not only because individual and environmental influences persist, but also because patterns of transactional processes become established at early ages and persist at later ages (Caspi, 2000; Sameroff, 2000).

Pathways include transitional periods that are characterized by developmental challenges, which are nearly universal, and transition-linked turning points that provide opportunities for life-long changes in behavior patterns, but need not do so in all cases (Graber & Brooks-Gunn, 1996). Continuity in development also results from the decreasing malleability of pathways over the life course. An individual's progression along a given trajectory inevitably entails the loss of potential alternative pathways, as transition-linked turning points may open or close opportunities. Consequently, at each step in development the decision to follow one pathway narrows possible directions of future pathways, resulting in a "crystallization" of trajectories across the life course (Cairns and Rodkin, 1998; Magnusson, 1998).

Despite continuity in developmental trajectories, because development is thought to be a transactional process, individuals remain sensitive to environmental pressures for change throughout life, both positive and negative. An intervention's success or failure in the short term is dependent on whether it can elicit positive patterns of adaptation in the current context. An intervention's continuing benefit is contingent on positive patterns of adaptation being sustained in subsequent environments that entail new demands and possibly new sources of adversity.

Given the active role that individuals may play in shaping their environments, creating intervention-induced environments that support positive adaptations may be much more difficult later in life than previously recognized. However, early childhood may provide an unusual window of opportunity for interventions because young children are uniquely receptive to enriching and supportive environments. Young children have less control over their environments than individuals at almost any other stage of development. They lack both the independence to actively choose environments and stable social cognitive representations that select and interpret experiences. Starting in early childhood and continuing throughout adolescence, individuals develop differentiated perceptions of self and others. Once stable, these mental representations shape an individual's experiences (Magnusson, 1998). As individuals age, they gain the independence and ability to shape their environments, rendering intervention efforts more complicated and costly.

What does this general framework of development suggest for designing program that promote human capital development? We focus on the implication of developmental theories for understanding the "production function" for academic and labor market success. Developmental theory posits a more sophisticated view of the production function than economists, because it suggests that there is more than one pathway to a developmental outcome. Rather than being the direct result of cognitive ability, developmental theory argues that human capital results from an individual's ability and motivation to organize cognitive, social, and behavioral capacities. Consequently, in order to intervene to promote human capital, it is important to understand the

full constellation of underlying processes that lead to failure in school and the labor market. For example, using high school drop out as a proxy for low human capital, we would need to understand the multiple pathways and processes that lead to school dropout, identify populations that are at risk of following each pathway, and design different interventions that target the processes that contribute to each of the different pathways.

Unfortunately, research has not identified a clear typology of pathways that lead to school drop out or labor market failure, and this has hampered our ability to construct successful interventions to promote human capital (Rumberger, 1995). In the absence of this knowledge, interventions have typically taken the approach of trying to teach skills that are presumed to be lacking—by offering academic or job-related skills curriculums in classroom settings and on the job training. In addition, some programs have also offered supports that might increase participants' access to these programs, for example, child care assistance for parents.

From what research is available we know that at least for some individuals, dropping out of high school is one event along a trajectory of academic disengagement and failure (Rumberger, 1987, 1995). Some of the strongest predictors of dropping out of school are poor performance in the early school years, including special education placement and grade retention (Rumberger, 1995). To the extent that early school failure sets in motion a trajectory of school failure and interventions in early childhood can promote early school achievement, then intervening in early childhood may be the most effective way to promote human capital throughout the life course.

Increasing early academic skills may be a powerful way to both build early skills and promote positive academic self-perceptions, both of which will set children on positive trajectories. Because early skills form the foundation of later skills and knowledge, failing to master these skills may lead to permanent deficits that are difficult to overcome even with the assistance of later intervention. Heckman and colleagues (2002) suggest the most skilled youth and adults benefit from intervention and learning opportunities later in life. Consequently, early childhood programs may succeed in promoting human capital if they provide children with the foundation skills that they might otherwise be lacking.

During the early school years children develop perceptions of their own academic competence. Research suggests that these perceptions are established in response to children's perceptions of their own abilities in school, and become relatively stable by third or fourth grade (Chapman et al., 2000). These self-perceptions appear to determine whether children pursue or avoid opportunities to acquire and refine the academic skills and strategies characteristics of proficient learners, expend effort and persist in the face of difficult challenges (Chapman et al., 2000; Helmke & van Aken, 1995). This suggests that if an early childhood intervention succeeds at boosting children's academic skills, even if only in the short-term, it may lead children to have more positive perceptions of their own abilities. If instilling positive academic self-concepts increases the likelihood that students seek out learning opportunities and remain engaged in school, then it may result in long-term benefits to human capital.

In addition to early school failure, two other pathways to dropping out of school have been suggested by research—early parenthood and problem behavior. Among adolescent girls, early parenthood may interrupt schooling, and therefore it might be the gateway of a pathway to low human capital (Moore & Waite, 1977; Rumberger, 1987). However, it is important to keep in mind that the teen parenthood and school failure may be different endpoints in the same

developmental process and thus part of a larger problem behavior syndrome (Allen, Philliber, Herrling, and Kupermic, 1997). It may be that early school failure and teen parenthood have are the results of similar antecedents—for example, poor parenting—or it may be that the causal direction is reversed such that early school failure leads teen girls both to drop out of school and to transition into parenthood (for a review of studies see Coley & Chase-Lansdale, 1998). In fact, one third of teen mothers drop out of school before having a child, suggesting that low educational achievement precedes teenage parenthood (Coley & Chase-Lansdale, 1998). Nevertheless, because of the potential connection between early pregnancy and dropping out of school, we include a review of pregnancy prevention programs in our chapter.

Finally, the overlap of externalizing problem behavior and school failure has led some researchers to suggest that problem behavior causes both school and labor market failure (Hinshaw, 1992). As with the case for teen parenthood, the direction of causation has not been clearly established. For example, some research suggests that childhood behavior problems and early academic failure may result from antecedent problems—perhaps cognitive deficits (Allen, et al., 1997; Hinshaw, 1992). However, research on externalizing problem behavior and aggression has yielded a wealth of information of the developmental processes that lead to problem behavior, and has been used to create numerous interventions and treatments for children and adolescents with behavior problems (Greenberg et al., 2002). Again, because of the potential connections between human capital development and behavior problems, we also review these programs in the following section.

3. EVIDENCE ON INDIVIDUAL INTERVENTIONS

How effective are interventions focused on individuals? We categorize our literature review by life cycle stage, beginning with the preschool years.

3.1 Preschool education programs

A handful of high-quality center-based interventions have demonstrated remarkably profitable impacts on the lives of economically disadvantaged children (Karoly et al., 1998). These programs have improved children's school and adult employment outcomes and reduced their criminal behavior. Whether less intensive programs will demonstrate positive impacts on children and long-term benefits to society is less clear, but we conclude that the weight of the evidence to date indicates that these programs may also improve children's life courses.

Child-focused early-education intervention programs are designed to provide economically disadvantaged children with cognitively stimulating and enriching experiences that their parents are unlikely to provide at home. These programs provide developmentally appropriate learning curricula and a variety of enriching activities in a classroom setting. Most of these programs also offer some activities for parents, although typically the parent activities are much less intensive than the child-focused intervention. At the time of school entry, children who participate in early-education programs are better prepared for school (West et al., 2000).

Several recent comprehensive reviews of experimental evaluations of high quality early-childhood education programs have concluded that intensive programs improve children's short-term cognitive development and long-term academic achievement, as well as reduce children's special education placement and grade retention (Barnett, 1995; Farran, 2000; Karoly et al., 1998). Furthermore, some of these programs also improve children's long-term social behavior,

as indicated by fewer arrests and reports of delinquent behavior. Finally, the evaluation of the Perry Preschool Program found that its participants had significantly better labor market outcomes compared with the control group nearly 27 years after the program ended (Schweinhart et al., 1993).

Once one looks beyond the evaluations of these intensive "efficacy" interventions, one finds virtually no experimental evaluations of more policy-relevant, less intensive child-focused programs. Non-experimental evaluations of less intensive programs provide some valuable suggestive evidence that these programs may be effective. For example, Barnett's (1995) review of large-scale early childhood education programs concludes that these programs demonstrate short-term impacts on children's school outcomes such as grade retention and special education placement, both of which impose large resource costs upon schools. However, very few studies have collected data on whether these program impacts persist into children's later years or affect children's social behavior. One non-experimental study of the Parent Child Development Centers in Chicago (Reynolds et al., 2001) found that children who were involved in the early childhood education program had higher rates of high school graduation and lower rates of juvenile delinquency than a comparison group of children.

Some recent non-experimental analyses of the long term of effects of Head Start, a less intensive and less expensive early education intervention, have also shown important long-term behavioral and academic benefits for children. The sibling-based analysis in Garces et al. (2002) found that Head Start is associated with a significantly increased probability of completing high school and attending college for whites and less crime among blacks. They also found evidence that there are positive spillovers from older children who attended Head Start to their younger siblings. These recent findings replicate earlier work by Currie and Duncan (1995).

It is also regrettable that few of these studies have systematically measured program costs and benefits. In fact, cost-benefit studies have been conducted for only two child-focused early childhood education programs — Perry Preschool and the Chicago Child Parent Center. Karoly's (2002) review of these studies found that each provided benefits that were over three times the cost of the program. Lacking randomized long-term studies of less intensive child-focused interventions, we are unable to irrefutably conclude that they too would produce benefits in excess of their more modest costs.

3.2 Schooling quality and drop-out prevention

Children in Western countries spend an average of more than 12 years in formal education. As already argued, the social payoff to keeping adolescents in school, at least prior to entry into universities, appears high enough to constitute an important goal for intervention programs. One might think that improving the quality of years spent in school may constitute an intervention if, in comparison to average quality schools, high quality schools promote academic outcomes and prevents children from dropping out of school. We find that the empirical evidence of the efficacy of improving general school quality as an intervention is controversial.

3.2.2 School quality. Evidence on the impacts of improving the *quality* of schooling is somewhat contradictory (Hanushek, 1986; Card and Krueger, 1996). Hanushek (1997) argues that there is little systematic evidence suggesting that increasing school resources will increase student performance. Reanalysis of his and other data has led other authors to claim more systematic impacts for expenditures and teacher experience (Hedges et al., 1994) and class size (Krueger, 1999a). In addition, experimental evidence from a large class-size experiment in

Tennessee confirmed that reducing class size, especially in the early grades, improves student achievement, particularly among black and disadvantaged students (Krueger, 1999b; Nye, Hedges, and Konstantopoulos, 2001). For young students that show early signs of school failure, one-on-one instruction or tutoring appears to be an effective means to improve their short-term academic outcomes (Elbaum et al., 2000). Perhaps a safe conclusion from this literature is that spending more money on the quality of their schooling years has, at best, selective payoffs, with much to be learned about the dimensions of school quality that matter the most for improving children's academic outcomes.

3.2.3 Dropout prevention programs. As previously suggested, keeping adolescents in school appears to have a high payoff. In the U.S., high school graduation rates increased during the 1970s and 80 before stabilizing; however, particular populations still have distressingly low rates of high school completion (Hauser et al., 2000). For example, the drop out rate is much higher for Hispanics (45%) and African-American (17%) compared to White students (8%) (Kaufman, Alt, & Chapman, 2001). A variety of school-based programs have been developed to improve high school graduation rates for at-risk populations. Have these programs succeeded in preventing adolescents from dropping out of school?

Dynarski (2000) reviews the findings from random-assignment evaluations of sixteen dropout prevention programs, half of which served middle school students, while the other half served high school students. Of the middle school programs, half provided only supplemental services to students, such as tutoring or workshops on self-esteem. The other four middle school programs and all of the high school programs were high-intensity efforts, in that they taught children in smaller classrooms and provided more intensive counseling services. The high-intensity programs included both programs that were located within regular schools and programs that had their own facilities. Of these sixteen programs, only one program significantly reduced dropout rates of the program group. Three of the intensive alternative middle school programs also had positive impacts on students' highest grade completed, but did not affect student's test scores, and appear to have lowered students' attendance rates (Dynarski, 2000). All in all, the evidence indicates that U.S. programs focused on adolescent school drop-out preventions are ineffective.

3.3 Child and adolescent problem behavior interventions

Child-focused problem behavior treatments are based on research showing that children with severe problem behaviors, particularly aggressive or externalizing behaviors, demonstrate deficiencies in a large range of cognitive and social skills. Aggressive children tend to misinterpret the actions of others and attribute hostile intent to others in situations in which the cues are ambiguous (Dodge, 1993). Furthermore, such children tend to lack problem-solving skills and have difficulties managing impulses, maintaining attention, and developing positive relationships with peers and adults.

Child-based treatments for disruptive behavior disorders include three related types of programs: problem-solving skills training, cognitive behavioral treatments, and social skills programs. Although each type of program emphasizes slightly different dimensions of children's deficits, the overarching goal is to teach children how to approach and react to interpersonal situations and problems more appropriately. Although programs vary in the techniques employed, children are taught how to self-direct their thoughts, control anger, and to use step-by-

step approaches to solve problems in real world situations. These problem-solving skills include identifying and perceiving problems, generating alternative solutions, choosing a solution, and evaluating an outcome so that maladaptive problem-solving strategies can be corrected (Dumas, 1989).

In general, evaluations of these child-based interventions suggest that these programs are often successful in reducing problem behavior in the sort term. In a meta-analysis of cognitive behavioral treatments for children, Durlak and colleagues (1991) found that the mean effect size of the program treatment was .50 at program completion and .56 approximately four months later. Reviews of completed studies are encouraging, but should be qualified a recognition of study design flaws. Most studies have small sample sizes, are plagued by high rates of attrition, and do not have long-term follow-up studies. Durlak and colleagues (1991) reported that the average follow-up study was conducted just four months after the completion of the treatment. Given the evidence that other types of interventions produce positive short-term gains that fade over time, establishing whether child-based programs will yield long-term benefits is an important area for further research. At least one study found that program-induced improvements in children's externalizing behavior had disappeared two to three years after program completion (Lochman, 1992). An accounting of program costs and benefits are almost never provided in this literature, so it is unclear whether the social rate of return from these often-intensive programs has been positive.

For the purposes of this chapter, we would be interested in knowing whether these programs also improved children's school and academic outcomes. Unfortunately, few studies of behavior problem programs include academic outcomes in their study. A study of the well-known Fast Track program, which combines child program with parent component, has included children's academic outcomes. The program evaluation found positive effects of the program on children's problem behavior and academic achievement in first grade (Conduct Disorders Prevention Research Group, 2001). By the end of third grade, program impacts persisted for problem behavior, but in the academic domain impacts were limited to special education placement. Nevertheless, it is possible that reductions in special education placement and behavior problems will translated into long-term positive impacts on human capital outcomes.

3.4 Teen pregnancy prevention programs

Despite recent declines teen pregnancy rates, more than four in ten U.S. teen girls get pregnant at least once before age 20, a figure that is several times as high as in European countries. Concern over teen pregnancy and its negative effects on both the mothers' and children's lives has spawned hundreds of intervention program designed to reduce it, although few good studies of these programs effectiveness (Coley & Chase-Landale, 1998; Frost & Forrest, 1995). Interventions have ranged from to educating adolescents about contraceptives, teaching adolescents social skills, and visiting nurse services.

Kirby's (2000) review of experimental and quasi-experimental evaluations of teen prevention programs suggests that more often than not, programs designed to prevent youths' sexual behavior fail to reduce the frequency or delay the onset of sexual behavior. Of twenty-eight programs focused on abstinence, sexual education, and HIV prevention, only 10 delayed the age of sexual initiation. Only 19 programs measured the frequency of youths' sexual activity, and of these programs 13 had no significant impacts. In addition, the programs were rather

unsuccessful at increasing teenagers' use of contraception. Only four of the eleven sexuality program evaluations that measured teenagers' use of contraception found positive program impacts on adolescents' reported use of contraception.

3.5 Youth and adult labor-market interventions

Western countries have long used labor market interventions involving training and job search assistance to promote employment and increase earnings. The evaluation literatures about these programs are extensive, and many U.S. studies are based on random assignment. Our summary of the results of these evaluations draws heavily on the reviews provided by Heckman et al. (1999), Grubb (1996) and Karoly (2002).

Both the kinds of training programs and the population subgroups to which they have been offered vary enormously. The vast majority of U.S. programs target economically-disadvantaged individuals. Least intensive are job search assistance programs, which often cost only a few hundred dollars per participant and provide only a few hours of instruction about how to find and apply for jobs. More substantial work experience and training programs typically cost several thousand dollars, although in the case of the U.S. Job Corps program, the costs are close to $15,000 per participant. Some of these programs seek to boost participants' employment rates; others target wage rates, and some seek to improve both of these outcomes.

The extent to which these programs accomplish their goals is typically inferred from program impacts on participants' earnings and employment rates. Consequently, there is virtually no information about the non-pecuniary returns to these intervention programs, including whether they have affected individuals' behavior or well-being outside of their labor market participation.

One way of summarizing the results of the random-assignment interventions is by showing what fraction of their evaluations revealed statistically significant, positive impacts on employment or earnings. Heckman et al. (1999, Table 22) show that of the 21 random-assignment interventions directed at adult women, half (11) produced significant positive impacts on rates of employment, while a little over half (15 of 26) had significant positive impacts on earnings. A closer look at the type of program shows that the less expensive programs were about as likely to produce significant impacts as the more expensive programs.

The more general conclusion of Heckman et al. (1999) regarding employment interventions for adult women is that you get what you pay for, but none are magic bullets. When statistically significant, the cheaper job search programs often produced relatively small absolute gains -- a few hundred dollars over the course of a year or two. The more expensive, training-based programs often produced proportionately bigger employment and earnings gains, closer to a few thousand dollars over the course of a year or two, but none produced dramatic employment or earnings gains for most participants.

The picture for disadvantaged adult men is less encouraging. Only about one-third of the interventions produced statistically significant impacts on either employment or earnings. Here again, there was no single type of program that emerged as a cure-all.

Bleakest of all are the results for youth training programs. None of them had significant impacts on either employment or earnings. Although the number of studies of youth programs is small, the programs include JOBSTART and the Job Training Partnership Act (JTPA), both of

which involved large, multi-site evaluations. Similarly, evaluations of New Chance (Quint, Bos, and Polit, 1997) and Teen Parent Demonstration (Maynard, Nicholson, and Ranagaran, 1993), two model programs designed to provide training opportunities and work supports to teen mothers, showed only marginal impacts on teen's educational attainment, and no substantial impact on their labor market outcomes.

Results from the JTPA evaluation are particularly revealing since the same training program (costing between $1,000 and $2,000 per participant) was administered to both disadvantaged youth and adults (Orr et al., 1996). Favorable employment and earnings impacts were found for adults but not youth, despite similar rates of program enrollment for the two groups. A search for impacts among 39 subgroups of youth defined by baseline characteristics failed to produce a single one with statistically significant positive impacts.

There is some recent, more positive, evidence from short-run evaluations of outcomes for recent youth cohorts in the Job Corps program (Shochet et al., 2000). The Job Corps program is very expensive ($15,000 per year), involving a thirty-week residential program that provides educational and vocational training, counseling, health education, and job placement. Its evaluation finds large positive program impacts on participants' wages, welfare receipt, and arrests. The cost-benefit analysis by Burghardt and colleagues (2001) suggests that the return for every dollar spent on the program Job Corp returns two dollars to society in higher productivity, lower welfare receipt and reduced crime. However, this conclusion rests on the assumption that program induced increases in participants' earnings will persist indefinitely, and critics suggest that this assumption is unfounded (Caneiro & Heckman, 2002). Looking only at the period during which participants' earnings were observed, Burghardt and colleague's analyses indicates that participants earned a non-significant $264 more than their control counterparts. The findings from the Job Corps indicate that even the most intensive skill-building programs offer weak evidence of profitable interventions.

Evaluations of European training programs rarely involve random assignment and typically focus on youth. The non-experimental nature of these evaluations gives us pause, especially given the history of wildly divergent results from competent non-experimental U.S studies of important training programs such as the Comprehensive Employment and Training Act.[3]

Heckman et al. (1999) review 43 such European studies and draw two conclusions. In contrast to the U.S. studies, the European studies often estimate large and statistically significant impacts on youth employment rates. However, very few of the European studies show positive and significant impacts on labor-market earnings, a finding more consistent with U.S. based studies. The impacts for employment rates are promising, but it is unclear whether the employment gains found for the youth in the programs came at the expense of employment losses for other groups in the labor market. The lack of impacts on earnings is discouraging, since earnings are a better indicator of labor-market productivity impacts of the intervention programs.

[3] Heckman et al. 1999, Table 24, lists six nonexperimental evaluations of the 1976 CETA cohort. For men, one estimated that net benefits exceeded $1000 per participant, two estimate large (<-$1,000) negative net benefits and the other three gave net estimates between -$1,000 and +$1,000.

Thus, despite the prediction that interventions would be more difficult and costly after early childhood, we find evidence that adult women are amenable to skill and labor-market based interventions. The same does not appear to be the case for other adults and for older teens.

3.6 Teen mentoring programs

The failure of individual level programs to improve the wellbeing of adolescents stands in stark contrast to the effectiveness of programs that target younger children and adults. This raises the question of why it appears that interventions with teenagers are less effective. Some scholars have argued that youth training programs and pregnancy prevention interventions may fail because they are didactic and nature and treat adolescents as young adults rather than as adolescents (Allen et al., 1997; Coley & Chase-Lansdale, 1998). That is, they attempt to instruct adolescents rather than help them navigate the more general developmental tasks of adolescence. They argue that adolescents display problem behaviors when they have difficulties developing autonomy in the context of close and positive adult relationships. This had led to the creation of intervention programs that allow adolescents to establish themselves as autonomous, capable individuals while interacting closely with adults and in some cases their peers. One example of this type of youth development program are mentoring programs (Roth and Brooks-Gunn, 1998).

Rigorous evaluations of a small number of intensive teen mentoring programs have produced promising results, as have programs with other designs that incorporate a caring adult-to-adolescent relationship (Roth and Brooks-Gunn, 1998; Templeton and Eccles, 2001). For example, a random-assignment evaluation of the Big Brother Big Sister program by Grossman and Tierney (1998) showed large program impacts across a wide range of teen achievement and behavior outcomes some 18 months after random assignment. These gains did not come cheaply, however, since the Big Brother Big Sister programs typically involved more than 100 hours of direct contact between adolescents and the adult mentors, and considerable staff time in screening applicants and monitoring the mentoring relationship. Costing $10,600 per participant and typically involving more than 1,200 hours of educational activities for the participant, the Quantum Opportunities program (Taggart, 1995) is another example of an intensive youth intervention program that has produced positive impacts some several years after program completion.

DuBois et al. (forthcoming) synthesize results from 55 evaluations of mentoring programs, although only 15 of the 55 were based on random-assignment methodology and program staff rather than outside evaluators conducted two-thirds of the 55 evaluations. The average program impact for the random-assignment evaluations was only one-eighth of a standard deviation on measures of emotional well-being, high-risk behavior, social competence, school outcomes, and employment outcomes. An exploration of whether program characteristics moderated the effects of these programs suggested that overall, more structured and intensive programs had larger, but still modest effects. For example, programs that used mentors who were in a "helping profession," provided or going training and supervision for the mentors had larger effects on youth than those that did not. In addition, few programs had follow-up studies that were conducted after the program's completion. Program cost data are rare in these evaluations, rendering difficult judgments about whether these modest impacts are likely to exceed program costs, particularly because the programs that are most effective also appear to be the most costly.

4. EVIDENCE ON PARENT-FOCUSED INTERVENTIONS

4.1 Tax, transfer and welfare-to-work programs targeting family socioeconomic resources

An important set of parent-focused "programs" target parental socioeconomic resources such as income and education in hopes that enhancing these resources will promote children's development (Haveman and Wolfe, 1994; Brooks-Gunn et al., 1995).[4] Causal links between these resources and child well-being are controversial questions in the social sciences. On the one hand, literatures in psychology, sociology and economics are filled with studies demonstrating strong associations between children's developmental outcomes and such resources as family income, parental education and composite indicators of socioeconomic status. On the other, developmentalists such as Scarr (1992) argue that genetic forces leave little room for environmental consequences on the part of all but the direst family conditions. Although the as-yet-unknown ways in which genes interact with family environments argue against such an extreme view, it is also true that much of the empirical literature on SES and child outcomes fails to address the possibility that genetic forces may account for some of the observed associations.

4.1.1 Household socioeconomic resources. Economic models of child development (e.g., Becker, 1981) view families with higher economic resources as better able to purchase or produce important "inputs" into their children's development - for example, nutritious meals; enriched home learning environments and childcare settings outside the home; safe and stimulating neighborhood environments; and, with older children, higher-quality schools and college education. The most commonly used measure of household economic resources is household income - the sum of income from all sources received by all members of the household over a given time period.

Human capital constitutes a second form of SES-based family resources, and as described earlier includes the collection of parental skills acquired in both formal and informal ways (Becker, 1975). Parents' formal education may well influence children's well-being by enhancing cognitive stimulation in the home learning environment and promoting more verbal and supportive teaching styles (Harris, Terrel and Allen, 1999). Although most developmental researchers believe parent-child interactions account for the bulk of parental education's effects on children (e.g., Laosa, 1983), the skills acquired through formal education may also enhance parents' abilities to organize their daily routines and resources in a way that enables them to accomplish their parenting goals effectively (Michael, 1974). Improving parental education may also improve child outcomes by boosting other household resources, most notably income.

Occupations are a much-studied component of socioeconomic status, with higher-status occupations typically conferring higher earnings, more control, and more prestige on workers

---

[4] Conspicuously absent from this list is parental "social capital." This consists of relationships parents and sometimes children themselves build up with relatives, friends, teachers and institutions that may provide benefits to either parents or their children. Although potentially important for children's development, parental social capital and its connections to children's outcomes have only begun to be investigated in the literature, and almost exclusively in correlational rather than experimental studies. We know of no experimental evidence regarding the efficacy of social capital interventions.

holding them (Jencks, Perman and Rainwater, 1988). In a two-generation context, researchers have argued that parents acquire values and cognitive skills through their occupations, and that these are passed on to children through parenting practices. Some evidence exists for both of these proposed pathways of influence (Kohn, 1969; Luster et al., 1989; Menaghan and Parcel, 1991). However, studies typically cannot clearly establish that occupations shape individuals, rather than individual selecting occupations that fit pre-existing characteristics. We do not discuss parental occupation further in the paper because of the dearth of occupation-focused interventions.

Many studies, books, and reports have reported correlations between children's SES and various measures of child achievement, health, and behavior. These kinds of correlations say little about the true causal connections between SES and child outcomes. As compared with nonpoor children, for example, poor children have a much higher risk of low school achievement, but that fact does not mean that increasing the incomes of poor parents would necessarily improve children's school achievement. Indeed, behavioral geneticists raise the issue of whether SES resources can have any effect on children's development (e.g., Rowe, 1994; Rowe and Rodgers, 1997). Here we review evidence on the causal impacts of the components of SES on child development, beginning with experimental studies.

4.1.2 Experimental studies of family economic resources and children's development. In four income-maintenance experiments in the 1960s and 1970s, families were randomly assigned to treatment groups that received income supplements and a control group that received no special income supplements (Institute for Research on Poverty, 1976; Kershaw and Fair, 1976; U.S. Department of Health and Human Services, 1983; Salkind and Haskins, 1982). However, parenting and child outcomes were not measured very well in the evaluation studies. School performance and attendance were affected positively in some sites among elementary-school-age children, but not among high-school-age adolescents. In the two sites reporting high-school completion and advanced education, these outcomes were higher for the experimental group.

Welfare reform experiments in the 1990s did a much better job of measuring parenting and child outcomes, although in the context of experimental treatments that involved work requirements and incentives and, in some cases, time limits, job training and other features of current U.S. welfare reform efforts. Some of these programs augmented family economic resources while others did not (Morris et al., 2001). In all cases, participants were randomly assigned to a treatment group that received the welfare-reform package or to a control group that continued to live under the old welfare rules.

Comparable analyses of these data by Morris et al. (2001) revealed that welfare reforms that both increased work and provided financial supports for working families generally promoted children's achievement and positive behavior, although children's achievement appeared to improve more than their behavior. In contrast, welfare reforms that mandated work but did not support it financially had few impacts -- positive or negative -- on children. Thus, it appeared that merely increasing maternal employment had no impact on children's achievement but increasing both work and income did.

Welfare reform impacts on children depended crucially on the ages of the children studied. Elementary-school children benefited from the reforms that increased family resources and, for the most part, unsupportive ones did not harm them. For adolescents, evidence suggests

that generous reforms that promoted maternal employment may have increased school problems and risky behavior (Gennetian et al., 2002).

Stepping back from the successful impacts on children's achievement, it is interesting to ask whether these programs affected parents. Almost all of them increased parental employment rates but only the more generous ones improved family income as well. Interestingly, there were virtually no significant impacts of any of the programs on either mothers' mental health or parenting. Thus, hopes of welfare reformers that market work would transform family life for the better failed to materialize. Nor, on the other hand, did the worst fears of reform naysayers who argued that work would add unbearable levels of stress to already-struggling families.

Welfare reform impacts on children depended crucially on the ages of the children studied. Elementary-school children were helped by the reforms that increased family resources and, for the most part, unsupportive ones did not harm them. For adolescents, more limited evidence suggested that even generous reforms that promoted maternal employment may have increased school problems and risky behavior.

Neighborhood resources may also matter for children's development, although establishing the scope and nature of neighborhood effects using nonexperimental data has proved remarkably elusive (Brooks-Gunn et al., 1997; Leventhal & Brooks-Gunn, 2001). In 1994, the U.S. Department of Housing and Urban Development launched a remarkable random-assignment experiment known as Moving to Opportunity (MTO) in five cities: Baltimore, Boston, Chicago, Los Angeles, and New York. In each city, some 600 families with children living in public housing within these cities' worst neighborhoods volunteered for the program. Families allocated to the experimental group received housing vouchers and counseling that enabled them to relocate to private-market housing, but by the program's design these subsidies could only be redeemed in very low-poverty neighborhoods (census tracts with poverty rates less than 10 percent).

Evaluations conducted roughly three years after random assignment show remarkably positive impacts for elementary-school-aged children but mixed results for adolescents (Katz et al., 2000; Ludwig et al., 2000; Ludwig et al., 2001). For example, the proportion of experimental children passing a state reading test nearly doubles compared with the pass rate of the control group, and standardized reading and math scores for experimental children relative to controls are on the order of one-quarter of a standard deviation of the percentile-score distribution. In contrast, adolescents in the experimental group show somewhat higher rates of grade retention, disciplinary actions, school dropout and arrest rates for property crimes. Importantly arrests for much costlier violent crimes are substantially lower in the experimental group relative to controls.

To date, a full accounting of the costs and benefits of the work support and the MTO programs has not demonstrated whether they will yield positive social profits. The initial positive findings on children's well-being are promising, while the mixed impacts on adolescents are less so. Follow-up studies are currently underway to determine if these effects persist.

4.1.3 Nonexperimental studies of family economic resources and children's development. Despite these experiments, whether family resources affects children's development remains a controversial issue that has generated a large nonexperimental literature (Haveman and Wolfe, 1995; Mayer, 1997; Brooks-Gunn and Duncan, 1997; Blau, 1999).

Some compelling quasi-experimental data on the independent role of SES come from a recent adoption study that compared the pre- vs. post-adoption IQs of children adopted into low-, middle- and high-SES families (Duyme et al., 1999; Duyme, this volume). All of the adopted children had low IQs (in the 60-86 range) prior to adoption and were adopted between ages 4 and 6. IQ growth was strikingly different by SES (defined by father's occupation), with the gains associated with adoption into high- and middle-SES families much larger than the IQ gains for children adopted into low-SES families. Furthermore, the authors were able to discount differential selection as a possible cause of the differences. Thus, the evidence suggests that something about SES -- unrelated to genetic endowment -- was responsible for the differential gains.

Duncan and Brooks-Gunn (1997) provide a recent look at links between poverty and development by coordinating analyses of 12 groups of researchers working with 10 different non-experimental developmental data sets. On the whole, the results suggest that family income may have substantial but decidedly selective associations with children's attainments. The selective nature of effects included the following: i) family income had much larger associations with measures of children's ability and achievement than with measures of behavior, mental health and physical health; ii) family economic conditions in early childhood appeared to be more important for shaping ability and achievement than did economic conditions during adolescence; and iii) the association between income and achievement appeared to be non-linear, with the biggest impacts at the lowest levels of income. The importance of economic conditions during early childhood was confirmed in Duncan et al.'s (1998) analysis relating children's completed schooling to average household incomes in early and middle childhood, and in adolescence.[5]

4.1.4 Tax and transfer policies that increase household incomes. In the case of redistributive policies, it is hoped that increased parental incomes through tax and transfer policies will trickle down through increased spending on children to promote children's development. There are enormous differences in the extent to which Western governments use tax and transfer policies to redistribute household income (e.g., Smeeding and Ross, 1999), with the smallest reduction in poverty from redistribution in the United States.

Assume that redistribution policies successfully boost poor children's family incomes by, say, $5,000 per year for five years. What impact would we expect this to have on children's developmental outcomes? If the causal estimates of Duncan et al. (1998) are accurate, a $5,000 increment to income averaged over the first five years of life for children in low-income families would produce nearly a one-half year increase in completed schooling, and a 70% increase in the

---

[5] Not all of the sophisticated studies in the literature support these conclusions. Using the Panel Study of Income Dynamics and the National Longitudinal Survey of Youth, Mayer (1997) provides a set of tests for omitted-variable bias and finds large reductions in the estimated impact of parental income, leading her to conclude that much of the estimated effect of income in the literature is spurious. Blau (1999) uses data from the National Longitudinal Survey of Youth to estimate a number of models relating income and other aspects of parental family background to children's ability and achievement test scores as well as behavior problems. In general, he finds small and insignificant effects of current income and larger (although still modest) effects of long-run income. As detailed in Duncan et al. (1997), this evidence is not inconsistent with the view that income supplements to low-income families would boost the achievement levels of young children, but it does suggest that these issues are ongoing subjects of research.

odds of finishing high school, but would have no significant impact on the risk of a nonmarital teen birth for females. A comparable income increment in middle childhood or adolescence would be associated with no significant increases in any of the measured schooling or fertility outcomes. Furthermore, the nonlinear nature of the family income/child outcome relation estimated in Duncan et al. (1998) suggests that the reduction in income of more affluent families needed to finance the $5,000 increments to low-income families would not significantly reduce schooling or increase teen fertility among them.

The more general message of the welfare-reform experiments and the Duncan and Brooks-Gunn's (1997) conference volume is that family resource increments are more likely to improve children's achievement than their physical or mental health or their problem behavior. To the extent that it is both profitable and important to improve children's social and behavior as well, it appears prudent to look beyond redistribution and to direct intervention as a way of enhancing children's outcomes.

4.2 Second-generation consequences of targeting adult skills

4.2.1 Parental schooling. Large and statistically significant positive correlations between parental schooling levels and children's achievement and behavior are among the most replicated results from developmental studies. Parental education has also been found to have strong correlations with parental teaching styles and the home learning environment. Haveman and Wolfe's (1995) review of published studies suggests that mothers' educational attainment is more closely related to children's academic performance than fathers' educational attainment. Furthermore, parents' completion of high school or a year or two of post-secondary education appears to have a larger effect on child outcomes than additional years of post-secondary education beyond that level.

Nevertheless, surprisingly little is known about the causal nature of these associations (Mercy and Steelman, 1982). Most work in this area does not establish that these findings are attributable to mothers' relative schooling per se, as opposed to genetic differences or other characteristics that differentiate mothers who acquire different levels of schooling. A long list of spurious factors could be driving the maternal education-child development correlation, the most obvious of which is maternal cognitive abilities. For example, Borduin and Henggeler (1981) argue that differences in parent-child interactions typically attributed to education or social-class are due to mother and children's verbal IQ rather than SES. Few studies attempt to control statistically for maternal cognitive ability and the many other factors that might bias non-experimental estimation strategies. Studies that do include such controls find that they reduce the association between maternal education and children's outcomes (e.g., Rosenzweig and Wolpin, 1994; Yeates et al., 1983).

We know of only one study of the impacts of mothers' schooling on children's development that involves experimental manipulation of mothers' schooling. Magnuson and McGroder (2001) exploit the fact that the National Evaluation of Welfare to Work Strategies Child Outcome Study (NEWWS COS) randomly assigned welfare recipients with young children to either an education- or work-focused program group or to a control group that received no additional training. Magnuson and McGroder take advantage of the experimental design by using an Instrumental Variable (IV) approach to estimate the effect of maternal schooling on five- to seven-year-old children's academic school readiness. They estimate that an

additional nine months of schooling causes a quarter of a standard deviation increase on a test of children's academic school readiness.

Merely assigning mothers to an education-oriented program such as the NEWWS COS has not improved children's academic outcomes (McGroder et al., 2000; Quint et al., 1997). However, it is likely that these non-findings may have resulted from the relatively small impact the program had on mothers' educational participation. For example, in the NEWWS Child Outcome Study mothers assigned to the education treatment participated in educational programs for less than two months more, on average, than mothers assigned to the control condition did. Such a small program impact on education was due both to the fact that close to half of the mothers never participated in any educational activities at all, but also to the fact that a quarter of mothers in the control condition participated in educational activities over the course of the study (Magnuson and McGroder, 2001). Consequently, the key to realizing the two-generation gain for an education-based program appears to be designing and implementing programs that successfully increase mothers' education.

A study by Neiss and Rowe (2000) merits mentioning because it tried to account for the confounding correlations among parental genes, parental educational attainment, children's genes, and children's outcomes by using a research design that account for the genetic similarities among parents and children. Using a sample of adopted adolescents and matched biological children in two parent families, Neiss and Rowe estimate the proportion of the association between parental education and children's' verbal IQ that is attributable to genetics and to educational attainment per se. They found that parental education was significantly but modestly associated with adolescents verbal IQ. The correlation between maternal education and child's verbal IQ was .16, and the correlation between paternal education and child's IQ was .18.

4.2.2 Parenting programs A long line of research (reviewed in McLoyd, 1990, 1998) has found that low-income parents, as compared with middle-class parents, are somewhat more likely to use an authoritarian and punitive parenting style and less likely either to be responsive to their children's needs or to provide them with stimulating learning experiences in the home. They are also somewhat more likely to use physical punishment and other forms of power-assertive discipline, and less likely to ask children about their wishes and reward children for positive behavior. In general these types of parenting practices are considered to have a detrimental effect on children's well-being (McLoyd, 1998). Depending on the particular domains considered and the extent to which research designs account for omitted variable biases, the associations between these aspects of parenting and children's outcomes range from very weak to moderate (McLoyd, 1998; Magnuson and Duncan, 2000). In fact some argue that some aspects of power-assertive discipline may not be harmful, and may beneficial among some low-income populations (Deater-Decker, Dodge, Bates, & Petit, 1996).

Although this literature provides little convincing causal evidence, many interventions to help low-income children focus on parents and parenting. Parenting interventions may include home visits, group supports, and informational sessions, and some combine both parent-focused and child-focused programs. Despite the diversity of designs, most programs are based on the common assumption that parents are children's first and best teacher, and therefore interventions are most efficient when they target parents' behavior directly (Seitz and Provence, 1990). Parenting interventions typically provide mothers with some form of social support, emotional and instrumental, as well as instructional information about child development. The expectation

is that this combination of services will improve mothers' capacities to provide their children with sensitive caregiving as well as other experiences that promote healthy development (Seitz and Provence, 1990; Gomby et al., 1999).

In general, programs focused solely on parents have demonstrated an ability to improve some of aspects of parenting, but not the cognitive and social well-being of low SES children (Yoshikawa, 1994; Brooks-Gunn et al., 2000). Brooks-Gunn and colleagues (2000) reviewed evaluations of 24 parent-focused home interventions for low SES children. Remarkably, nineteen of these programs produced favorable effects on parenting outcomes, including more sensitive parenting and a higher-quality home environment. However, positive program impacts on parenting were not consistently associated with positive program impacts on children's cognitive or behavioral outcomes. Given the different program designs and populations served by these disparate programs, it is difficult to determine whether the lack of consistent findings is due to flaws in implementation of the programs, or weaknesses of the causal models.

The successes of a few intensive parenting intervention programs are noteworthy. Most famously, the experimental evaluation of an intensive nurse home visitation program by Olds and colleagues (Olds et al., 1999) in Elmira, New York found that the program had lasting effects on important indicators of disadvantaged children's well-being. In particular, a fifteen-year follow-up study found that unmarried mothers assigned to the program group had fewer verified reports of child abuse and neglect than mothers assigned to the control group. Furthermore, their children had fewer emergency health-related visits, reported arrests and lifetime sex partners, and they reported less tobacco and alcohol use than did children in the control group. Olds and colleagues have undertaken replication studies in two sites—Memphis and Denver. Results from a three-year follow up study of the Memphis program indicate positive but more limited impacts on parenting and child outcomes, but success in preventing subsequent births (Olds et al., 1999). Evidence from additional follow-up studies in Memphis and Denver will provide important information about the likelihood of replicating the success of the Elmira program.

Involving an average of nine visits during the pregnancy and 23 visits during the first two years of the child's life by registered nurses and costing approximately $6,000, Olds' program was clearly at the intensive end of parenting programs. As with early education programs, it is crucial to ask whether the positive child impacts from intensive programs such as Olds' carry over to more practical, less intensive programs. As suggested by Gomby's and colleagues review, (1999) the answer appears negative.

4.2.1 Parent Management Training. In contrast to parent education programs, parent management training programs appear to be a promising intervention strategy, at least in the case of improving the behavior of children with severe behavior problems. These programs were developed in response to research showing that maladaptive parenting and parent-child interaction patterns are common in families of severely conduct-disordered children (Kazdin, 1997; Kazdin & Weisz, 1998; Taylor & Biglan, 1998). Often described as coercive, this type of parenting involves harsh but inconsistent punishment for children's problem behavior, and a failure to attend to positive children's behavior (Dumas, 1989; Patterson, DeBaryshe, & Ramey, 1989). Parent management training programs teach parents to respond more appropriately to their children's behavior. Specifically, clinical therapists teach parents to reward and attend to their children's positive behavior, but to ignore or punish their child's problem behavior appropriately and consistently. Parents are taught to identify and react to their children's

behavior in new ways. Treatment sessions provide parents with the opportunity to observe appropriate parenting skills as well as practice and refine their own use of these skills.

In general, reviews of evaluations of parent management training programs show that these programs can lead to meaningful reductions in children's problem behaviors. One review suggests that approximately two-thirds of the children exhibit clinically significant improvements in behavior at the completion of the program (Taylor & Biglan, 1998). Another review suggests that the average effect size was .87 -- a large effect (Durlak, Fuhrman, & Lampman, 1991).

The reviews also suggest that parent management training may be less effective with adolescents than with younger children.   Differential effects, however, may be due to the severity of the problem behavior rather than the child's age (Ruma, Burke & Thompson, 1996). Adolescents' behavior problems tend to be more severe than young children's, and for this reason, parent management training may be less successful at improving their behavior.   Parents of adolescents are more likely to drop out of parenting training programs, and this may also explain why adolescents benefit less from parent-focused programs (Dishion & Patterson, 1992).

Although reviews of parent management training programs conclude that these programs can reduce children's problem behavior substantially, whether such conclusions hold up depends on the quality of the research reviewed. Not all of the included studies used random assignment to experimental and control groups, sample sizes were typically quite small, and attrition rates, if reported, were high. Perhaps most worrisome is that when families dropped out of treatment, they were not included in the follow-up study, suggesting that the evaluation findings reflect the effect of completing the program. Few studies have follow-up data beyond 6 months after program treatment, and therefore the long-term benefit of parenting programs is still questionable (Greenberg, Domitrovich, & Bumbarger, 2000). None of these studies consider whether these programs had a positive effect on children's academic outcomes, nor do they provide an accounting of program costs and benefits.

Finally, it is important to keep in mind that most parents who participated in these studies were referred for treatment or were seeking out help for their children's behavior. For example, to be admitted to Webster-Stratton's group videotape program, parents had to be referred to the clinic for children's "excessive non-compliance, aggression, and oppositional behavior for more than six months" (Webster-Stratton, 1990, p. 145). It is possible that one reason that parenting interventions have been more successful at reducing severe problem behavior than at promoting academic achievement is that parents of children with severe behavior problems may be more likely to be engaged in parenting programs than parents of children with less severe problems since they find themselves "under siege" (Webster-Stratton & Spitzer, 1996).

5. CONCLUSIONS

The length of human life and the portion of it spent with parents provide abundant opportunities for individual and parent-focused interventions designed to enhance human potential. Our look at such interventions has combined economic and developmental considerations to examine the skill-based, behavior-based, socioeconomic and parenting interventions that share the goals of promoting achievement and positive behavior.

Both economic and developmental theories suggest that interventions targeting young children directly may be the most effective of all. Although a handful of careful studies of very intensive early-education programs support this view, the small amount of evidence on the payoffs from more practical, less expensive programs leaves us cautiously optimistic about drawing definitive conclusions regarding interventions at this stage of the life cycle (Figure 3).

In the case of adolescent and adult interventions economic considerations caution that their costs are likely to be greater and their payoffs lower, than interventions at younger ages Developmental theory suggests the possibility for effective adolescent and adult interventions, but, again point that the programs may be more difficult and costly than interventions for young children. Remarkably, we find that experimental studies document numerous encouraging examples of significant but substantively modest payoffs to skill and employment interventions for adult women. You get what you pay for, it appears, and the likelihood of success is greater for adult women than adult men.

The successes of labor market programs for adult women are even the more striking when compared to the failure of skills and labor market based interventions for adolescents. All but the most intensive programs that provide expensive and comprehensive supportive services for adolescents fail to prove profitable.

The indirect nature of parent-focused programs suggests that success stories may be less frequent for them. The typical parenting education intervention has not demonstrated significant impacts on child well-being, although given the evidence to date parent management training programs appear to be more effective. Results of evaluations of recent welfare-to-work and residential mobility interventions indicates that increasing the economic resources of low-income families promotes positive achievement and behavior for children, although the effect sizes are modest, and we do not know if the impacts will persist. Interestingly, the gains are found for elementary-school-age but not adolescents, which further lend support to our view of the difficulties of interventions involving adolescents.

Our preoccupation with the economic aspects of interventions is rooted in a desire to inform policy-makers about choices among competing real-world intervention programs as well as tax and transfer policies that alter family resources. Although much more needs to be learned, our tentative conclusion is that the bulk of intervention resources should be focused on pre-adolescent children. It may also make sense to tilt transfer programs explicitly toward families with young children, as the French have done with single-parent benefits that end with the child's third birthday, or that other countries could do with age-graded child allowances or tax credits. The remainder of the social investment resources should be focused on adults rather than adolescents.

We certainly do not recommend abandoning adolescent programs altogether, only that given our current program options, the optimal social portfolio of life-cycle interventions might do well to limit adolescent programs to relatively few successful and intensive ones and offer them to the subset of adolescents in greatest need of services. Above all, they should not be so costly as to divert resources from the apparently more profitable earlier-in-life interventions that prevent adolescent problems from occurring in the first place, or the subset of adult programs that are successful in repairing the damage that may have already occurred.

REFERENCES

Alexander, K. L., & Entwisle, D. R. (1988). Achievement in the first two years of school: Patterns and processes. Monographs of the Society for the Research in Child Development, 53 (2, Serial 218).

Allen, J. P., Philliber, S. Herrling, S., & Kuperminc, G. (1997). Preventing teen pregnancy and academic failure: Experimental evaluation of a developmentally based approach. *Child Development*, 64, 729-742.

Baltes, P. B. (1997). On the incomplete architecture of human ontogeny. American Psychologist, 52, 366-380.

Barnett, W. S. (1995). Long-term effects of early childhood programs on cognitive and school outcomes. The Future of Children, 5 (3), 25-50.

Becker, G. S. (1975). Human capital: A Theoretical Analysis with Special Reference to Education. New York: National Bureau of Economic Research.

Becker, G. S. (1981). A treatise on the family. Cambridge MA: Harvard University Press.

Ben-Porath, Y. (1967) . The Production of Human Capital and the Life Cycle of Earnings. Journal of Political Economy 75:352-365.

Blau, D. M. (1999). The effect of income on child development. The Review of Economics and Statistics, 8, 261-276.

Borduin, C. M., & Henggeler, . (1981). Social class, experimental setting and task characteristics as determinants of mother-child interactions. Developmental Psychology, 17, 209-214.

Bos, H., Huston, A., Granger, R., Duncan, G., Brock, T., & McLoyd, V. (1999) New hope for people with low incomes: Two-year results of a program to reduce poverty and reform welfare. NY: MDRC.

Bouchard, T., Lykken, D., McGue, M., Segal, N. & Tellegen, A. (1990) Sources of human psychological differences: The Minnesota study of twins reared apart, Science, 250, 223-228.

Brim, O. &Phillips, D. (1988). The life-span intervention cube. In E. M. Hetherington, R. M. Lerner, and M. Perlmutter (Eds.), Child development in life-span perspective (pp. 277-299). Hillsdale, NJ: Lawrence Erlbaum Associates.

Bronfennbrenner, U., & Morris, P. (1998). Handbook of Child Psychology.

Brooks-Gunn, J., Brown, B., Duncan, G., &Moore, K. A. (1995). Child development in the context of family and community resources: An agenda for national data collection. In National Research Council Institute of Medicine, Integrating federal statistics on children: Report of a workshop (pp. 27-97). Washington, D. C.: National Academy Press.

Brooks-Gunn, J, & Duncan, G. (1997). The effects of poverty on children and youth. The Future of Children, 7, 55-71.

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

Brooks-Gunn, J., Berlin, L. J., & Fuligni, A. (2001). Early childhood intervention programs: What about the family? In S. Meisels and J. Shonkoff (Eds.), The handbook of early intervention, second edition (pp. 549-588). New York: Cambrige University Press.

Burghardt, J., Schochet, P. Z., McConnell, S., Johnson, T., Gritz, R. M., Glazerman, S., Homrighausen, J., and Jackson, R. (2001). Does Job Corp work? Summary of the national Job Corp study. Washington, DC: Mathmetica Policy Research, Inc.

Cairns. R. B., &Rodkin, P. C. (1998). Phenomena regained: From configurations to pathways. In R. B. Cairns, L. R. Bergman, and J. Kagan (Eds.), Methods and Models for studying the individual (pp. 245-265). Thousand Oaks, CA: Sage Publications.

Card, D. (1999) In O. Ashenelter and D. Card Handbook of Labor Economics, Elsevier

Card, D., &Krueger, A. (1996). School resources and student outcomes: An overview of the literature and new evidence from North and South Carolina. Journal of Economic Perspectives, 10, 31-50.

Caspi, A. (2000). The child is father to the man: Personality continuities from childhood to adulthood. Journal of Personality and Social Psychology, 78, 158-172.

Carneiro, P., & Heckman, J. J. (2002). Human capital policy. Paper presented at the Alvin Hansen Seminar, Harvard University.

Chapman, J. W., Tummer, W. E., & Prochnow, J. E. (2000). Early reading-related skills and performance, reading self-concept, and the development of academic self-concept: A longitudinal study. Journal of Educational Psychology, 92, 703-708.

Coley, R. L., & Chase-Lansdale, P. L. (1998). Adolescent pregnancy and parenthood: Recent evidence and future directions. American Psychologist, 53, 152-166.

Conduct Problems Prevention Research Group. (2001). Evaluation of the first three years of the Fast Track Prevention Trial with children at high risk for adolescent conduct problems. Applied Developmental.

Currie, J., & Duncan, T. (1995). Does Head Start make a difference? American Economic Review, 85, 341-64.

Deater-Decker, K., Dodge, K. A., Bates, J. E., & Petit, G. S. (1994). Physical discipline among African-American and European American Mothers: Links to children's externalizing behaviors. Developmental Psychology, 32, 1065-1072.

Deci, E. L., & Ryan, R. M. (1985). Intrinsic motivation and self-determination in human behavior. New York: Plenum.

Dickens, W. T. & Flynn, J. R. (2001); "Heritability estimates versus large environmental effects: the IQ paradox resolved," Psychological Review, Vol. 108(2).

Dishion, T. J., & Patterson, G. R. (1992). Age effects in parent training outcome. Behavior Therapy, 23, 719-729.

Dodge, K. (1993). Social-cognitive mechanims in the development of conduct disorder and depression. Annual Review of Psychology, 44, 559-84.

Dubois, D. L., Holloway, B. E., Valentine, J. C., & Cooper, H. (forthcoming). Effectiveness of mentoring programs for youth: A meta-analytic review. Journal of Community Psychology.

Duncan, G. & Brooks-Gunn, J. Eds. (1997). Consequences of growing up poor. New York: Russell Sage.

Duncan, G., Brooks-Gunn, J., Yeung, J., & Smith, J. (1998). How much does childhood poverty affect the life chances of children? American Sociological Review, 63, 406-423.

Dumas, J. E. (1989). Treating anti-social behavior in children: Child and family approaches. Clinical Psychology Review, 9, 197-222.

Durlak, J. A., Fuhrman, T., & Lampman, C. (1991). Effectiveness of cognitive-behavioral therapy for maladapting children: A meta-analysis. Psychological Bulletin, 2, 204-214.

Dumye, M., Dumaret, A. C., & Tomkiewicz, S. (1999). How can we boost IQs of “dull children”?: A late adoption study. Proceedings of the National Academy of Sciences, 96, 8790-8794.

Dynarski, M. (2001). Making do with less: Interpreting the evidence from recent federal evaluations of dropout prevention programs. Paper presented at the conference “Dropouts: Implications and findings” held at Harvard University.

Elbaum, B., Vaughn, S.,Hughes, M. T., & Moody, S. W. (2000). How effective are one-on-one tutoring programs in reading for elementary students at risk for reading failure? A meta-analysis of the intervention research. Journal of Educational Psychology, 92, 605-619.

Farran, D. C. (2000). Another decade of intervention for children who are low-income or disabled: What do we know now? In J. Shonkoff and S. Meisels (Eds.), Handbook of early childhood intervention, Second edition (pp. 510-548). New York: Cambridge University Press.

Frost, J. J., & Forrest, J. D. (1995). Understanding the impact of effective teenage pregnancy prevention programs. Family Planning Perspectives, 27, 188-195.

Fuchs, V. (1983). How we live. Cambridge, MA: Harvard University Press.

Graber, J. A., & Brooks-Gunn, J. (1996). Transitions and turning points: Navigating the passage from childhood through adolescence. Developmental Psychology, 4, 768-776.

Garces, E., Thomas, D., & Currie, J. (2002) Longer-term effects of Head Start. American Economic Review, 92 (4), 999-1012.

Gennetian, L., Duncan, G., Knox, V. W., Vargas, W., Clark-Kaufman, E., & London, A. S. (2002). How welfare and work policies for parents affect adolescents. New York: Manpower Demonstration Research Corporation.

Gomby, D. S., Culross, P. L., & Behrman, R. E. (1999). Home visiting: Recent program evaluations analysis and recommendations. The Future of Children, 9 (1), 4-26.

Gramlich, E. (1990). A guide to cost-benefit analysis. Englewood Cliffs, NJ: Prentice-Hall.

Greenberg, M., Domitrovich, C. & Bumbarger, B. (2000). Preventing mental disorders in school-age children: A review of the effectiveness of prevention programs.

Grossman, J. B., and Tierney, J. P. (1998). Does mentoring work? An impact study of the Big Brothers Big Sisters Program. Evaluation Review, 22, 403-426.

Grubb, W. (1996). Learning to work: The case for reintegrating job training and education. New York: Russell Sage.

Gueron, J., & Pauly, E. (1991). From welfare to work. New York: Russell Sage Foundation.

Harris, Y.R., Terrel, D., & Allen, G. (1999). The influence of education context and beliefs on the teaching behavior of African American mothers. Journal of Black Psychology, 25, 490-503.

Hanushek, E. A. (1986). The economics of schooling: Production and efficiency in public schools. Journal of Economic Literature, 24, 1141-77.

Hanushek, E. A. (1997). Assessing the effects of school resources on student performance: An update. Educational Evaluation and Policy Analysis, 19, 141-64.

Hauser, R. M., Simmons, S., & Pager, D. (2000). High school dropout, race-ethnicity and social background from the 1970s to the 1990s, Department of Sociology, University of Wisconsin-Madison.

Haveman, R., & Wolfe, B. (1994). Succeeding generations: On the effect of investments in children. New York: Russell Sage Foundation.

Haveman, R., & Wolfe, B. (1995). The determinants of children's attainments: A review of methods and findings. Journal of Economic Literature, 23, 1829-1878.

Heckman, J. (1999). Policies to foster human capital. Paper presented at the Aaron Wildavsky Forum, Richard and Rhoda Goldman School of Public Policy, University of California at Berkeley.

Heckman, J., LaLonde, R. & Smith, J. (1999) The Economics and econometrics of active labor market programs. In O. Ashenelter and D. Card Handbook of Labor Economics, Elsevier

Hedges, L V., Laine, R. D., and Greenwald, R. (1994). Does money matter? A meta-analysis of studies of the effects of differential school inputs on student outcomes. Education Researcher, 23, 5-14.

Helmke, A. & van Aken, M. A. G. (1995). The causal ordering of academic achievement and self-concept ability during elementary school: A longitudinal study. Journal of Educational Psychology, 87, 624-637.

Hinshaw, S. P. (1992). Externalizing behavior problems and academic underachievement in childhood and adolescence: Causal relationships and underlying mechanism. Psychological Bulletin, 111, 127-125.

Hoff-Ginsberg, E. & Tardif, T. (1995). Socioeconomic status and parenting. In Bornstein, M. (ed.) Handbook of parenting, vol. 4. (pp.161-187). Mahwah, NJ: Lawrence Erlbaum Associates.

Institute for Research on Poverty (1976). The rural income maintenance experiment. Madison WI: University of Wisconsin, Author.

Jencks, C. S., Perman, L., & Rainwater, R. (1988). What is a good job? A new measure of labor market success. American Journal of Sociology, 93, 1322-57.

Kagan, J. (1979). Family experience and the child's development. American Psychologist, 34, 886-891.

Karoly, L. (2002) Investing in the future: Reducing poverty through human capital programs. In S. Danziger and R. Haveman (eds.) Understanding Poverty in America: Progress and Problems, Cambridge, MA: Harvard University Press.

Karoly, L. A., Greenwood, P. W., Everingham, S. S., Houbé, J., Kilburn, M. R., Rydell, C. P., Sanders, M., and Chiesa, J. (1998). Investing in Our Children: What We Know and Don't Know about the Costs and Benefits of Early Childhood Interventions. Santa Monica, CA: RAND.

Katz, L., Kling, J., & Liebman, J. (2001) Moving to Opportunity in Boston: Early Results of a Randomized Mobility Experiment, Quarterly Journal of Economics, 116, 607-654.

Kaufman, P., Alt, M.N., & Chapman, C. (2001). Dropout rates in the United States: 2000. U.S. Department of Education, NCES. Washington, DC: U.S. Government Printing Office.

Kazdin, A. E. (1997). Parent management training: Evidence, outcomes, and issues. Journal of the American Academy of Child and Adolescent Psychiatry, 36, 1349-1356.

Kazdin, A. and Weisz, J. R. (1998). Identifying and developing empirically supported child and adolescent treatments. Journal of Consulting and Clinical Psychology, 66, 19-36.

Kershaw, D., and Fair, J. (1976). The New Jersey Income Maintenance Experiment. Vol. 1. New York, NY: Academic Press.

Kirby, D. (2001). Emerging Answers: Research findings on programs to reduce teen pregnancy. Washington, DC: National Campaign to Prevent Teen Pregnancy.

Kohn, M. L. (1969). Class and conformity: A study in values. Homewood, IL: Dorsey Press.

Krueger, A. B. (1999a). An economist's view of class size research. Unpublished working paper.

Krueger, A. B. (1999b). Experimental estimates of education production functions. Quarterly Journal of Economics, 114, 497-532.

Laosa, L. (1983). School, occupation, culture and family. In E. Sigel and L. Laosa (Eds.), Changing Families (pp.79-135). NYC, NY: Plenum Press

Leventhal, T., & Brooks-Gunn, J. (2000). The neighborhoods they live in: The effects of neighborhood residence on child and adolescent outcomes. Psychological Bulletin, 126, 309-337.

Levin, H. (1983). Cost effectiveness: A primer. Beverly Hills, CA: Sage.

Lindblom, C. R. (1980). The policymaking process. Englewood Cliff, NJ: Prentice Hall.

Loehlin, J.C., Horn, J. M., & Willerman, L. (1989) Modeling IQ change: Evidence from the Texas Adoption Project. Child Development, 60, 993-1004.

Lochman, J. E. (1992). Cognitive-behavioral intervention with aggressive boys: A three year follow-up and preventive effects. Journal of Consulting and Clinical Psychology, 60, 426-432.

Ludwig, J., Duncan, G. and Hirschfield, P. (2001). Urban Poverty and Juvenile Crime: Evidence from a Randomized Housing-Mobility Experiment. Quarterly Journal of Economics, 116.

Ludwig, J., Ladd, H., & Duncan, G. (2001) The Effects of Urban Poverty on Educational Outcomes: Evidence From a Randomized Experiment. In William G. Gale and Janet Rothenberg Pack (eds.) Brookings-Wharton Papers on Urban Affairs(pp. 147-201). Washington, DC: Brookings.

Luster, T., Rhoades, K., & Haas, B. (1989). The relation between parental values and parenting behavior: A test of the Kohn Hypothesis. Journal of Marriage and the Family, 51, 139-147.

Magnuson, K. A., & Duncan, G. (2001). Parenting in Poverty, in M. Bornstein (Ed.), Handbook of Parenting (pp.).

Magnuson, K. A., & McGroder, S. (2001) From ABE to 123s: The Effect of Maternal Education on Children's School Readiness. Poster Presented at the Population Association of America, March 2001, Washington, DC.

Magnusson, D. (1998). The logic and implications of a person-oriented approach. In R. B. Cairns, L. R. Bergman, and J. Kagan (Eds.), Methods and Models for studying the individual (pp. 33-64). Thousand Oaks, CA: Sage Publications

Magnusson, D., & Stattin, H. (1997). Person-context Interaction theories. In W. Damon (Ed.), Handbook of child psychology, fifth edition, Volume 1 (pp. 685-759). Wiley.

Masten, A. S., & Curtis, W. J. (2000). Integrating competence and psychopathology: Pathways toward a comprehensive science of adaptation. Development and Psychopathology, 12, 529-550.

Mayer, S. (1997). What money can't buy: The effect of parental income on children's outcomes. Cambridge, MA: Harvard University Press.

Maynard, R., Nicholson, W., & Rangarajan, A. (1993). Breaking the Cycle of Poverty: The Effectiveness of Mandatory Services for Welfare-Dependent Teenage Parents. Princeton, NJ: Mathematica Policy Research, Inc.

McCarton, C. M., Brooks-Gunn, J., Wallace, I., Bauer, I. F., Charles, R., Bennett, F. C., Bernbaum, J. C., Broyles, R. S., Casey, P. H., McCormick, M. C., Scott, D. T., Tyson, J., Tonascia, J., & Meinert, C., L. (1997). Results at age 8 years of early intervention for low-birth-weight premature infants: The infant health and development program. Journal of American Medical Association, 277, 126-132.

McGroder, S. M., Zaslow, M. J., Moore, K. A., & LeMenestrel, S. M. (2000). National evaluation of welfare-to-work strategies impacts on young children and their families two years after enrollment: Findings from the child outcomes study. Washington, CD: United States Department of Health and Human Services Office of the Assistant Secretary for Planning and Evaluation Administration for Children and Families.

McLoyd, V. (1990). The impact of economic hardship on black children and families: Psychological distress, parenting, and socio-emotional development. Child Development, 61, 311-346.

McLoyd, V. (1998). Socioeconomic disadvantage and child development. American Psychologist, 53, 185-204.

Menaghan, E. G. & Parcel, T. L. (1991). Social sources of change in children's home environments: The effects of parental occupational experiences and family conditions. Journal of Marriage and the Family, 57, 69-94.

Mercy, J. A., & Steelman, L. C. (1982). Familial influence on the intellectual attainment of children. American Sociological Review, 47, 532-542.

Michael, R. T. (1972). The effect of education on efficiency in consumption. New York, NY: Columbia University Press.

Michael, R. T. (1982). Measuring non-monetary benefits of Education: A survey. In W. W. McMahon and T. G. Geske (Eds.), Financing education: Overcoming inefficiency and inequality. Chicago, IL: University of Illinois Press.

Mincer, J. (1974) Schooling, experience and earnings New York: National Bureau of Economic Research.

Moore, K. A., & Waite, L. J. (1977). Early childbearing and educational attainment. Family Planning Perspectives, 9, 221-225.

Morris, P. A., Huston, A. C., Duncan, G. J., Crosby, D. A., & Bos, J. M. (2001). How welfare and work policies affect children: A synthesis of research. NY, New York: Manpower Demonstration Research Corporation.

Neiss, M. & Rowe, D. C. (2000). Parental education and child's verbal IQ in adoptive and biological families in the National Longitudinal study of Adolescent Health. Behavior Genetics, 30, 487-495.

Nye, B., Hedges, B., Konstantopoulos, S. (2001). The long-term effects of small classes in early grades: Lasting benefits in mathmematics achievement at grade 9. Journal of Experimental Education, 69, 245-257.

Olds, D., Henderson, C. R., Kitzman, H. J., Eckenrode, J. J., Cole, R. E., Tatelbaum, R. C. (1999). Prenatal and Infancy Home visitation by Nurses: Recent Findings. The Future of Children, 9, 44-65.

Orr, L., Bloom, H., Bell, S., Doolittle, F., Lin, W., and Cave, G. (1996) Does training for the disadvantaged work? Evidence from the national JTPA study. Washington, D.C.: Urban Institute Press.

Patterson, G. R., DeBaryshe, B. D., and Ramsey, E. (1989). A developmental perspective on anti-social behavior. American Psychologist, 44, 329-335.

Quint, J., Bos, H., and Polit, D. (1997). New Chance: Final report on a comprehensive program for young mothers in poverty and their children. NY: Manpower Research Demonstration Corporation.

Reynolds, A.J., Temple, J. A., Robertson, D. L. & Mann, E. A. (2001). Long term effects of an early childhood intervention on educational achievement and juvenile arrest: A 15 year follow-up of low income children in public schools. Journal of the American Medical Association, 285, 2339-46.

Roth, J. & Brooks-Gunn, J. (1998). Promoting healthy adolescents: Synthesis of youth development program evaluations. Journal of Research on Adolescence, 8, 423-459.

Rowe, D. C. & Rodgers, J. L. (1997). Poverty and behavior: Are environmental measures nature and nurture? Developmental Review, 17,358-375.

Rowe, D. C. (1994) The limits of family influence: Genes, experience and behavior. New York: Guilford.

Rosenzweig, M. R., & Wolpin, K. I. (1994). Are there increasing returns to the intergenerational production of human capital? Maternal schooling and child intellectual development. Journal of Human Resources, 29, 670-693.

Ruma, P. R., Burke, R. V., and Thompson, R. W. (1996). Group parent training: Is it effective for parents of all ages? Behavior Therapy, 27, 159-169.

Rumberger, R. W. (1995). Dropping out of Middle School: A multi-level analysis of students and schools. American Educational Research Journal, 32, 583-625.

Rumberger, R. W. (1987). High School Dropouts: A review of Issues and Evidence. Review of Educational Research, 57, 101-121.

Rutter, M. (2000). Psychosocial influences: Critiques, findings, and research needs. Development and Psychopathology, 12, 375-405.

Salkind, N. J., & Haskins, R. (1982). Negative income tax: The impact on children from low-income families. Journal of Family Issues, 3, 165-180.

Sameroff, A. J. (2000). Developmental systems and psychopathology. Development and Psychopathology, 12, 297-312.

Sameroff, A. J., & Fiese, B. H. (1990). Transactional regulation and early intervention. In S. J. Meisels and J. P. Shonkoff (Eds.), Handbook of early childhood intervention (pp. 119-191). New York: Cambridge University Press.

Scarr, S. (1992). Developmental theories for the 1990s: Development and individual differences. Child Development, 63, 1-19.

Scarr, S. & Weinberg, R. (1976). IQ performance of black children adopted by white families. American Psychologist, 31, 726-739.

Schweinhart, L., Barnes, H., & Weikart, D. (1993). Significant benefits: The High/Score Perry Preschool study through age 27. Ypsilanti, MI: High Scope Press.

Schochet, P. Z., Burghardt, J., & Glazerman, S. (2000). National Job Corp study: The short-term impacts of the Job Corp on participants' employment and related outcomes. Princeton, NJ: Mathematica Policy Research.

Schultz, T. W. (1961). Investment in human capital American Economic Review, 51, 1-17.

Seitz, V., & Provence, S. (1990). Caregiver-focused models of early intervention. In S. J. Meisels and J. P. Shonkoff (Eds.), Handbook of early childhood intervention (pp. 400-). New York: Cambridge University Press.

Shadish, W. R., Cook, T. and Campbell, D. T. (2002). Experimental and quasi-experimental designs for generalized causal inference. NY: Houghton Mifflin.

Shonkoff, J. P. & Phillips, D. A. (Eds.)(2000). From neurons to neighborhoods: The science of early childhood development. Washington, DC: National Academy Press.

Smeeding, T. & Ross, K. (1999). Social Protection for the Poor in the Developed World: The Evidence from LIS. Mimeo, Syracuse University, September.

Taggart, R. (1995). Quantum Opportunity Program. Philadelphia, PA: Public/Private Ventures.

Taylor, T. K., & Biglan, A. (1998). Behavioral family interventions for improving child-rearing: A review of the literature for clinicians and policy makers. Clinical Child & Family Psychology Review, 1, 41-60.

Templeton, J. & Eccles, J. S. (2001). Community-Based Programs for Youth: Lessons Learned From General Developmental Research and From Experimental and Quasi-experimental Evaluations. Urban Seminar on Children's Health and Safety, John F. Kennedy School of Government, Harvard University.

U.S. Department of Health and Human Services. (1983). Overview of the Seattle-Denver Income Maintenance Experiment and Final Report. Office of Income Security Policy. Washington, DC: U. S. Department of Health and Human Services.

Webster-Stratton, C. (1990). Long-term follow-up with young conduct problem children: From preschool to grade school. Journal of Clinical Child Psychology, 19, 144-149.

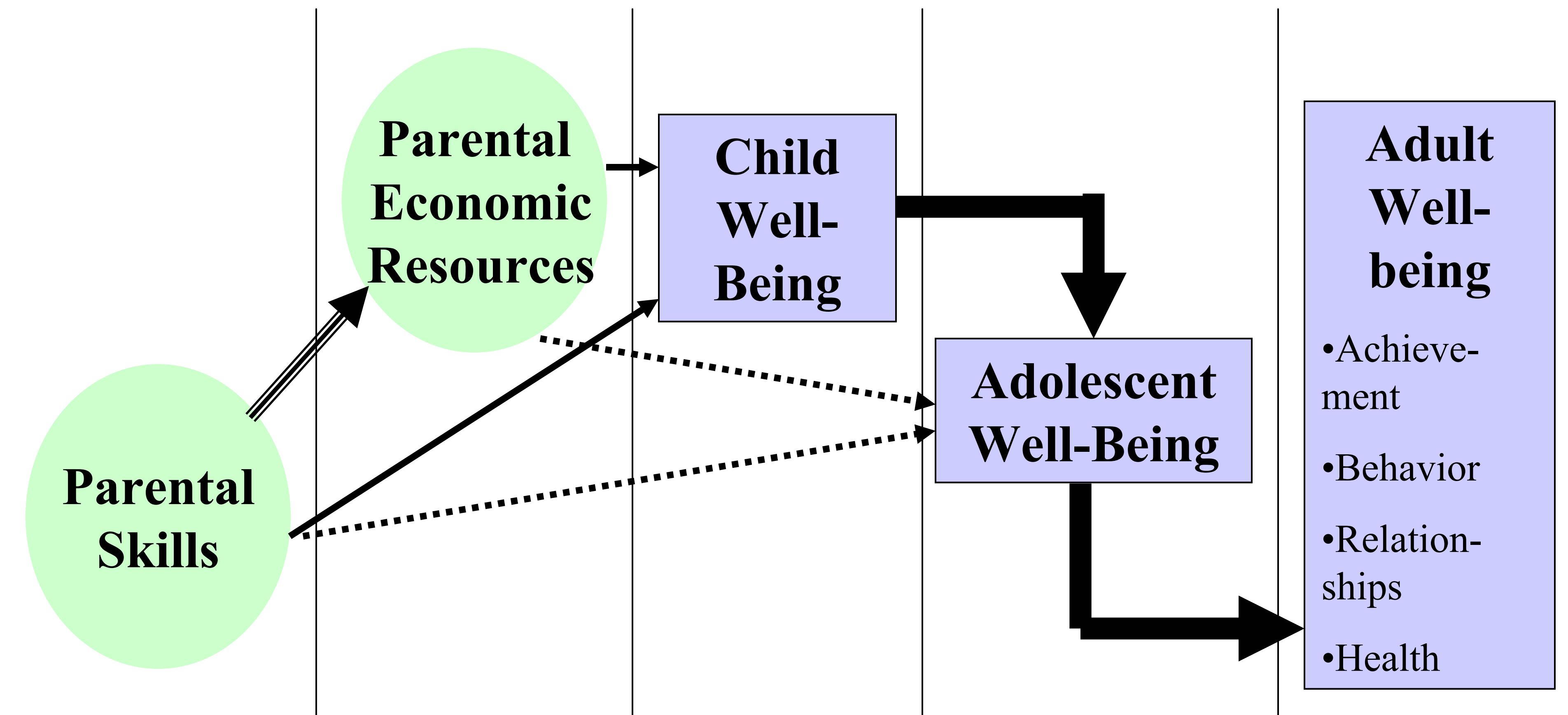
Webster-Stratton, C., & Spitzer, A. (1996). Parenting a young child with conduct problems. New insights using qualitative methods. In T. H. Ollendick and R. J. Prinz (Eds.), Advances in clinical child psychology (pp. 1-62). New York: Plenum Press.

West, Jerry, Kristin Denton, and Elvie Germino-Hausken (2000). America's Kindergartners: Findings from the Early Childhood Longitudinal Study, Kindergarten class of 1998-99: Fall 1998. Education Statistics Quarterly, 2, 7-13.

Yeates, K. O., MacPhee, D., Campbell, F. A., & Ramey, C. T. (1983). Maternal IQ and home environment as determinants of early childhood intellectual competence: A developmental analysis. Developmental Psychology, 19, 731-739.

Yoshikawa, H. (1994). Prevention as cumulative protection: Effects of early family support and education as chronic delinquency and its risk. Psychological Bulletin, 115, 28-54.

Figure 1: Points of intervention



Parent-based		Individual-based		
•Formal education •Job skill training •Parenting	•Taxes, transfers and welfare to work programs	•Early and formal education •Childcare	•Formal education •Mentoring •After-school programs	•Job skill training

Figure 2: Possible patterns of rates of return to interventions, by age

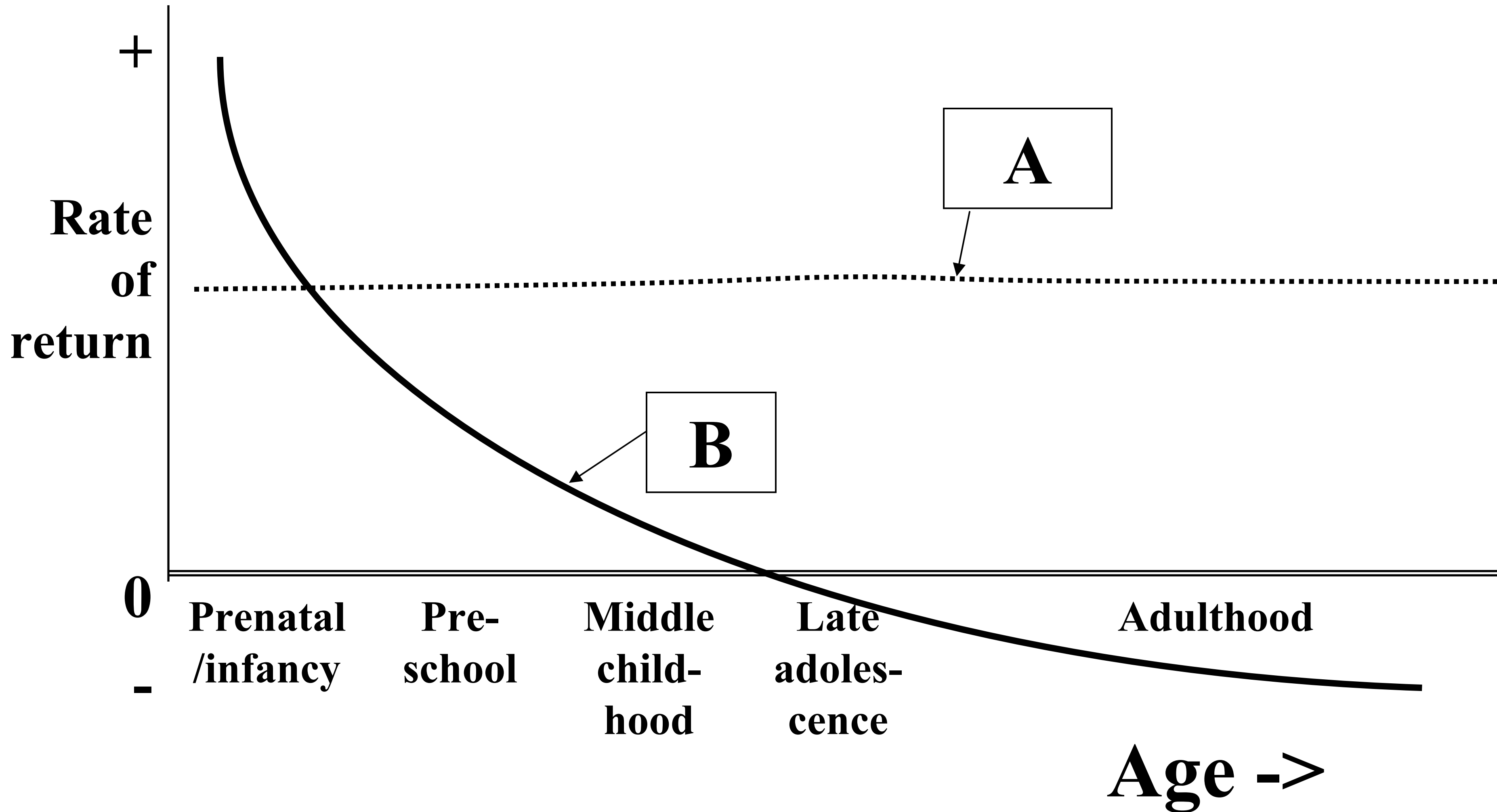


Figure 3: Summary of experimental evaluations of interventions

Individual-focused	
Preschool	Some evidence that intensive education programs produce large long-term payoffs, mostly by reducing problem behavior; uncertain impacts for less intensive programs
Middle childhood	Class size matters for early grades; impacts of other school inputs is unclear; Problem behavior treatment have positive short term effects
Adolescence	Little evidence that typical dropout prevention, pregnancy prevention, or skill/training programs are effective. Some very intensive interventions do show positive impacts. Mentoring programs appear to be modestly effective.
Adulthood	Considerable evidence that both small and larger training and work-related investments can boost earnings and employment, especially for women
Parent-focused	
Parental income	Boosting poor families' economic resources appears to improve children's achievement modestly; this effect may be stronger at younger ages
Parental education	Mixed evidence that promoting parental human capital benefits children
Parenting	With a few noteworthy exceptions, most parenting programs appear ineffective at improving children's outcomes. Parent Management Training Problems appear modestly effective at reducing children's problem behaviors.