Effective Child Development Strategies

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Debates and Issues in Preschool Education

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Abstract

This paper makes four points about designing effective child development strategies. The first point is that early intervention is effective, and the earlier it comes, the better. The second point is that a major channel through which early intervention programs operate is through producing noncognitive skills, which are often neglected in economic and social policy forums. This insight changes the way we think about evaluating the success and failure of programs and suggests that new evaluation frameworks are needed. The third point is that subsidies for early childhood programs should be targeted toward disadvantaged families. Programs can be made universal but, in light of stringency in budgets, programs should be subsidized only for the most disadvantaged families, where the measure of disadvantage is the quality of parenting. It is for children from these families that economic returns are the highest. Social efficiency is enhanced, and inequality is reduced, by targeting the most disadvantaged. The fourth point is that early childhood intervention efforts should not be conceived of as exclusively governmental programs. Engagement of nongovernmental entities and competition at an assured level of quality will promote diversity and quality and enlarge the funding base to support early childhood development programs.
I American Society is Becoming Polarized and Less Productive

In the past 30 years, American society has polarized. A greater percentage of children is attending and graduating college. At the same time, a greater percentage is dropping out of secondary school producing a growing underclass, neither working nor going to school [Heckman and LaFontaine 2010]. 75% of American youth who apply to the military are ineligible to serve because of low cognitive capacities, criminal records, or obesity. 20% of the U.S. work force has such a low rate of literacy that it cannot understand the instructions on a vial of pills [Heckman and Masterov 2007]. The slowdown in the growth of the skills of the workforce is reducing U.S. productivity and competitiveness [Delong, Katz, and Goldin 2003].

These problems are usually discussed separately, in a piecemeal fashion. Analysts blame the public schools, rising tuition costs, or the failure of a number of other social institutions. This has produced an array of competing proposals that lack coherence or a firm grounding in science and social science. This paper briefly summarizes a body of literature that articulates a coherent approach to addressing these problems that is rooted in the economics, psychology, and biology of human development. (See Cunha and Heckman 2007, 2008, 2009; Heckman 2008; Heckman and Masterov 2007)

II A Coherent Approach to Skill Policy

My argument can be summarized by eighteen points.

1. Many major economic and social problems such as crime, teenage pregnancy, obesity, high school dropout rates, and adverse health conditions can be traced to low levels of skill and ability in society.

2. In analyzing ability, society needs to recognize its multiple facets.

3. Current public policy discussions focus on promoting and measuring cognitive ability through IQ and achievement tests. For example, in the U.S. the accountability standards in the No Child Left Behind Act concentrate attention on achievement test scores, not
evaluating a range of other factors that promote success in school and life.

4. Cognitive abilities are important determinants of socioeconomic success.

5. So are socioemotional abilities, physical and mental health, perseverance, attention, motivation, and self confidence.

6. They contribute to performance in society at large and even help determine scores on the very tests that are used to monitor cognitive achievement.

7. Ability gaps between the advantaged and disadvantaged open up early in the lives of children.

8. Family environments of young children are major predictors of cognitive and socioemotional abilities, as well as crime, health and obesity.

9. More than genetics is at work.

10. The evidence that documents a powerful role of early family influence on adult outcomes is a source of concern because family environments in the U.S. and many other countries around the world have deteriorated over the past 40 years.

11. Experimental evidence on the effectiveness of early interventions in disadvantaged families is consistent with a large body of non-experimental evidence that adverse family environments, especially adverse parenting, substantially impair child outcomes.

12. If society intervenes early enough, it can raise the cognitive and socioemotional abilities and the health of disadvantaged children.


14. They also foster workforce productivity.

15. These interventions have high benefit-cost ratios and rates of return.
16. Early interventions have much higher economic returns than later interventions such as reduced pupil-teacher ratios, public job training, convict rehabilitation programs, adult literacy programs, tuition subsidies or expenditure on police, or a variety of programs recently funded under the Obama stimulus package.

17. Life cycle skill formation is dynamic in nature. Skill begets skill; motivation begets motivation. If a child is not motivated and stimulated to learn and engage early on in life, the more likely it is that when the child becomes an adult, it will fail in social and economic life. The longer society waits to intervene in the life cycle of a disadvantaged child, the more costly it is to remediate disadvantage. Similar dynamics appear to be at work in creating child health and mental health.

18. A major refocus of policy is required to understand the life cycle of skill and health formation and the importance of the early years in creating inequality and opportunity, and in producing skills for the workforce.


III The Importance of Cognitive and Noncognitive Skills

Recent research has shown that earnings, employment, labor force participation, college attendance, teenage pregnancy, participation in risky activities, compliance with health protocols and participation in crime strongly depend on cognitive and noncognitive abilities. By noncognitive abilities I mean socioemotional regulation, time preference, personality factors and the ability to work with others.

Much public policy discussion focuses on cognitive test scores or “smarts.” The No Child Left Behind initiative in the US focuses on achievement on a test administered at certain grades to measure the success or failure of schools. Yet the body of evidence surveyed in Borghans, Duckworth, Heckman, and ter Weel [2008] shows that, as is intuitively obvious and commonsensical, much more than smarts is required for success in a number of domains of life. They document the
predictive power of motivation, sociability, the ability to work with others, attention, self-control, self-esteem, time preference, and health in a variety of life outcomes.

The importance of noncognitive skills tends to be underrated in current policy discussions because they are thought to be hard to measure. Yet they have been measured and have been shown to be predictive of success. Recent evidence shows that the workplace is increasingly oriented towards a greater valuation of social interaction and sociability. (See the references in Borghans, Duckworth, Heckman, and ter Weel [2008].)

Cognitive and noncognitive ability are important determinants of schooling and socioeconomic success. In the U.S. and many countries around the world, schooling gaps across ethnic and income groups have more to do with ability deficits than family finances in the school-going years. (See the evidence in Cunha and Heckman [2007, 2008].) Those with higher cognitive and noncognitive abilities are more likely to take post-school company job training, to participate in civic life. They are less likely to be obese and have greater health and mental health. Cognitive and noncognitive skills are equally predictive of success in many aspects of life. (See Heckman, Stixrud, and Urzua [2006].)

IV Ability Gaps Are the Major Reason for the Schooling Achievement Gap

Controlling for ability measured at the school-going age, in the U.S. minorities are more likely to attend college than others despite their lower family incomes. Deficits in college going between minority and majority groups are not caused by high tuition costs or family income at the age children are deciding to go to college. (See Cameron and Heckman [2001].)

V Ability Gaps Open Up at Early Ages

Gaps in the abilities that play such an important role in determining diverse adult labor market and health outcomes open up at early ages across socioeconomic groups [Cunha, Heckman,
Lochner, and Masterov, 2006]. Schooling after the second grade plays only a minor role in alleviating these gaps. Schooling quality and school resources have relatively small effects on ability deficits and only marginally account for any divergence by age in test scores across children from different socioeconomic groups.

The evidence on the early emergence of gaps leaves open the question of which aspects of families are responsible for producing ability gaps. Is it due to genes? Family environments? Family investment decisions? The evidence from the intervention studies suggests an important role for investments and family environments in determining adult capacities above and beyond genes, and also in interaction with genes [Cunha and Heckman, 2009; Heckman, 2008].

VI Family Environments

The evidence that family environments matter greatly in producing abilities is a source of concern because a greater fraction of American children is being born into disadvantaged families. This trend is occurring in many countries around the world. (See, e.g., Arias, Azuara, Bernal, Heckman, and Villarreal, 2010, for evidence on Mexico.) Measured by the quality of its parenting, American family life is under challenge. A divide is opening up in early family environments. Those born into disadvantaged environments are receiving relatively less stimulation and child development resources than those from advantaged families. (See McLanahan, 2004) The real source of child disadvantage is the quality of parenting.

More educated women are working more, but, at the same time, are spending more time in child development. Less educated women are also working more but are not increasing their child investments. Those born into disadvantaged environments are receiving relatively less stimulation and child development resources than those from advantaged families, and the gap is growing over time. This creates persistence of inequality across generations through the mechanism of differentials in parenting. It raises an environmental version of concerns similar to those raised by the eugenics movement a century ago.
VII  Critical and Sensitive Periods

Knudsen, Heckman, Cameron, and Shonkoff [2006] discuss the large body of evidence on sensitive and critical periods in human development. Different types of abilities appear to be manipulable at different ages. IQ scores become stable by age 10 or so, suggesting a sensitive period for their formation below age 10 [Schuerger and Witt, 1989]. On average, the later remediation is given to a disadvantaged child, the less effective it is. A lot of evidence suggests that the returns to adolescent education for the most disadvantaged and less able are lower than the returns for the more advantaged [Carneiro and Heckman, 2003]. The available evidence suggests that for many skills and human capacities, later intervention for disadvantage may be possible, but that it is much more costly than early remediation to achieve a given level of adult performance [Cunha, Heckman, and Schennach, 2010].

VIII  Key Policy Issues

From the point of view of social policy, the key question is how easy is it to remediate the effect of early disadvantage? How costly is it to delay addressing the problems raised by early disadvantage? How critical is investment in the early years and for what traits? What is the optimal timing for intervention in different capacities?

IX  Enriched Early Environments Can Compensate In Part For Risk Features of Disadvantaged Environments

Experiments that enrich the early environments of disadvantaged children show that the effects of early environments on adolescent and adult outcomes are causal. Improvements in family environments enhance adult outcomes and operate primarily through improvements in noncognitive skills. Reliable data come from experiments that provide substantial enrichment of the early environments of children living in low-income families. Longitudinal studies of the experimental groups demonstrate substantial positive effects of early environmental enrichment
on a range of cognitive and “non-cognitive” skills, schooling achievement, job performance, and social behaviors, long after the interventions end.

X Some Evidence from a Flagship Early Intervention Program for Disadvantaged Children

The HighScope/Perry Program is the best studied of all of these intervention programs. It was an intensive preschool program that was administered to 58 disadvantaged, African-American children in Ypsilanti, Michigan between 1962 and 1967. See Schweinhart, Montie, Xiang, Barnett, Belfield, and Nores [2005]. The treatment consisted of a daily 2.5 hour classroom session on weekday mornings and a weekly 90 minute home visit by the teacher on weekday afternoons. The program fostered executive function and decision making. The length of each preschool year was 30 weeks. It was evaluated by the method of random assignment. The control and treatment groups have been followed through age 40.

An estimated rate of return (the return per dollar of cost) to the Perry Program is 6-10% for males and females [Heckman, Moon, Pinto, Savelyev, and Yavitz, 2010]. This rate of return is higher than the return on stock market equity and suggests that society can benefit substantially from early childhood interventions.

Perry did not have a lasting effect on the IQ of its participants. It raised participants’ noncognitive skills. Figure 1 from Heckman, Malofeeva, Pinto, and Savelyev [2010] reports a decomposition of the statistically significant treatment effects for the Perry program for males into contributions from boosts in IQ and boosts from noncognitive skills. Virtually all of the treatment effects come from changes in noncognitive skills produced by the program. Similar results are found for females.
XI The Dynamics of Skill Formation

The evidence from early intervention studies shows the following patterns. Skills beget skills. All capabilities are built on a foundation of capacities that are developed earlier. This principle stems from two characteristics that are intrinsic to the nature of learning: (a) early learning confers value on acquired skills, which leads to self-reinforcing motivation to learn more; and (b) early mastery of a range of cognitive, social, and emotional competencies makes learning at later ages more efficient and therefore easier and more likely to continue [Knudsen, Heckman, Cameron, and Shonkoff, 2006].

Second, early intervention lowers the cost of later investment. The advantages gained from effective early interventions are best sustained when they are followed by continued high quality learning experiences. The technology of skill formation developed in Cunha and Heckman [2007] and Heckman [2007] shows that the returns on adolescent schooling are higher for persons with higher ability, where ability is formed in the early years.

Cunha and Heckman [2008] and Cunha, Heckman, and Schennach [2010] estimate technologies of skill formation to quantify how the skills of the children evolve in response to (1) the stock of skills children have already accumulated; (2) the investments made by their parents; and (3)
the stock of skills accumulated by the parents themselves.

These frameworks allow analysts (a) to organize the evidence on outcomes and interventions from diverse literatures within a common framework; (b) to identify synergies among capabilities: how health, cognition and personality traits produce outcomes and interact in the production of capabilities; and (c) to recognize gaps in the literature and the possibilities for a variety of interventions to promote educational attainment and mental and physical health.

The major findings from estimates of the technology show that (a) the productivity of investment is much greater at younger ages than at older ages for all types of investments. This is due to the plasticity of the young. (b) If society waits until adolescence to invest in children in disadvantaged environments, it is costly. (c) It is much more difficult to compensate for the effects of adverse early environments on cognitive endowments in adolescence than it is at very young ages. This helps to explain the large body of evidence on ineffective cognitive remediation strategies for disadvantaged adolescents. Public job training programs, adult literacy services, prisoner rehabilitation programs, and education programs for disadvantaged adults at current levels of expenditure produce low economic returns. (See Cunha, Heckman, Lochner, and Masterov, 2006.) At the adolescent stage of the life cycle, investments in noncognitive skills are more effective than investments in cognitive skills.

Figure 2 summarizes a body of literature on the returns to the first dollar of investment at different stages of the life cycle for a young child. Because of the dynamics of skill formation (skill begets skill) early investments have a high return because they make later investments productive.

XII Practical Issues in Implementing Early Childhood Programs

While the case for early intervention is strong, there remain a variety of practical issues in implementing early childhood programs.

- **Who should be targeted?** The returns to early childhood programs are the highest for disadvantaged children who do not receive substantial amounts of parental investment in the early years. The available evidence suggests that the quality of parenting is the im-
important scarce resource. (See Cunha and Heckman, 2009) The quality of parenting is not always closely linked to family income or parental education. Measures of risky family environments should be developed that facilitate efficient targeting.

• **With what programs?** Programs that target the early years seem to have the greatest promise. The Nurse Family Partnership Program [Olds, 2002], the Abecedarian Program [Campbell, Ramey, Pungello, Sparling, and Miller-Johnson, 2002], and the Perry Program [Schweinhart et al. 2005] have been evaluated and show high returns. Programs with home visits affect the lives of the parents and create permanent changes in home environments that support the child after center-based interventions end. Programs that build self-control, character, and motivation that do not focus exclusively on cognition appear to be the most effective.

• **Who should provide the programs?** In designing any early childhood program that aims to improve the cognitive and socio-emotional skills of disadvantaged children, it is important to respect the sanctity of early family life and to respect cultural diversity. The goal of the early childhood programs is to create a base of productive skills and traits for disadvantaged children living in culturally diverse settings. By engaging private industry and other groups
that draw in private resources, create community support, and represent diverse points of view, effective and culturally sensitive programs will be created.

- **Who should pay for them?** One could make the programs universal to avoid stigmatization. Universal programs would be much more expensive and create the possibility of deadweight losses whereby public programs displace private investments by families. One solution to these problems is to make the programs universal but to offer a sliding fee schedule to avoid deadweight losses.

- **Will the programs achieve high levels of compliance?** It is important to recognize potential problems with program compliance. Many successful programs change the values and motivation of the child. Some of these changes may run counter to the values of parents. There may be serious tension between the needs of the child and the acceptance of interventions by the parent. Developing culturally diverse programs will help avoid such tensions. One cannot assume that there will be no conflict between the values of society as it seeks to develop the potential of a child and the values of the family, although the extent of such conflicts is not yet known.

**XIII Summary**

Many current social problems have their roots in deficits in abilities. Ability deficits open up early in life and persist. They produce inequality and lower productivity. Evidence from a variety of studies shows that there are critical and sensitive periods for development. Sensitive periods come earlier in life for cognitive traits. The age pattern is less pronounced for noncognitive traits. This pattern is associated with slower development of the prefrontal cortex. Noncognitive traits stimulate production of cognitive traits and are major contributors to human performance. The powerful role of noncognitive traits and the capacity of interventions to improve these traits is currently neglected in public policy discussions.

Later life investment is less efficient if an adequate base has not been created in early life. The econometric evidence is consistent with the evidence from neuroscience. Later investment
is more efficient if early investment is made. A portfolio of childhood investment weighted toward the early years is optimal. Society currently ignores this pattern in its investment in disadvantaged children, devoting more resources to adolescent remediation than childhood prevention [Cunha and Heckman, 2009; Moon, 2010]. Children from advantaged environments by and large receive substantial early investment. Children from disadvantaged environments typically do not. There is a strong case for public support for funding interventions in early childhood for disadvantaged children.

The appropriate measure of disadvantage is the quality of parenting, not income per se. Schools and tuition do not matter as much as is often thought. Late remediation is very costly. Social policy should be directed toward the malleable early years, if society is to successfully reduce inequality and promote productivity in American society.
References


