

The Effects of Cognitive and Noncognitive Abilities on Labor Market Outcomes and Social Behavior

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This article establishes that a low-dimensional vector of cognitive and noncognitive skills explains a variety of labor market and behavioral outcomes. Our analysis addresses the problems of measurement error, imperfect proxies, and reverse causality that plague conventional studies. Noncognitive skills strongly influence schooling decisions and also affect wages, given schooling decisions. Schooling, employment, work experience, and choice of occupation are affected by latent noncognitive and cognitive skills. We show that the same low-dimensional vector of abilities that explains schooling choices, wages, employment, work experience, and choice of occupation explains a wide variety of risky behaviors.

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Key features:

- Loadings vary by s ; factors explain all dependence

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- Risky behaviors (smoking, drugs, crime, pregnancy)

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- **Mechanisms:** Shows *how* abilities operate (preferences vs productivity, etc.)
- **Policy relevance:** (Could) simulate effects of interventions on primitives

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- Simulate model to plot conditional expectations of outcomes given factors
- Find evidence that the 2 factors do indeed load onto all outcomes

The Technology of Skill Formation

By FLAVIO CUNHA AND JAMES HECKMAN*

It is well documented that people have diverse abilities, that these abilities account for a substantial portion of the variation across people in socioeconomic success, and that persistent and substantial ability gaps across children from various socioeconomic groups emerge before they start school. The family plays a powerful role in shaping these abilities through genetics, parental investments, and through choice of child environments. From a variety of intervention studies, it is known that ability gaps in children from different socioeconomic groups can be reduced if remediation is attempted at early ages. The remediation efforts that appear to be most effective are those that supplement family environments for disadvantaged children. Cunha et al. (2006), henceforth CHLM, present a comprehensive survey and discussion of this literature.

This paper uses a simple economic model of skill formation to organize this and other evidence summarized here and the findings of related literatures in psychology, education, and neuroscience. The existing economic models of child development treat childhood as a single period (see, e.g., Gary S. Becker and Nigel Tomes 1986; S. Rao Aiyagari, Jeremy

Greenwood, and Aranth Seshadri 2002; and Roland Bénabou 2002). The implicit assumption in this approach is that inputs into the production of skills at different stages of childhood are perfect substitutes. We argue that to account for a large body of evidence, it is important to build a model of skill formation with multiple stages of childhood, where inputs at different stages are complements, and where there is self productivity of investment. In addition, in order to rationalize the evidence, it is important to recognize three distinct credit constraints operating on the family and its children. First, the inability of a child to choose its parents. This is the fundamental constraint imposed by the accident of birth. Second, the inability of parents to borrow against their children's future income to finance investments in them. Third, the inability of parents to borrow against their own income to finance investments in their children.

This paper summarizes findings from the recent literature on child development and presents a model that explains them. A model that is faithful to the evidence must recognize that (a) parental influences are key factors governing child development; (b) early childhood investments must be distinguished from late childhood investments; (c) an equity-efficiency trade-off exists for late investments, but not for early investments; (d) abilities are created, not solely inherited, and are multiple in variety; (e) the traditional ability-skills dichotomy is misleading—both skills and abilities are created; and (f) the “nature versus nurture” distinction is obsolete. These insights change the way we interpret evidence and design policy about investing in children. Point (a) is emphasized in many papers. Point (b) is ignored in models that consider only one period of childhood investment. Points (c), (d), and (e) have received scant attention in the formal literature on child investment. Point (f) is ignored in the literature that partitions the variance of child outcomes into components due to nature and those due to nurture.

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Policy implication: No equity-efficiency tradeoff for early childhood investment

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ESTIMATING THE TECHNOLOGY OF COGNITIVE AND NONCOGNITIVE SKILL FORMATION

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Key finding: Substitutability decreases over life cycle for cognitive skills (early investment crucial); constant for noncognitive skills