

Extended Abstract

It was not until recently that economists became interested in non-cognitive skills and their association with socioeconomic outcomes. Heckman, who has been interested in the dynamics of skill formation, has repeatedly pointed out the importance of both cognitive and non-cognitive skills in human development (Heckman, 2000; Heckman and Rubinstein, 2001; Carneiro and Heckman, 2003; Cunha and Heckman, 2007; Heckman and Masterov, 2007).

However, the economics literature on non-cognitive skills have focused on the impact on earnings [Goldsmith et al. (1997), Duncan and Dunifon (1998), Bowles et al. (2001), Dunifon et al. (2001), Cawley et al. (2001), Zax and Rees (2002), Groves (2005), Nyhus and Pons(2005), Mueller and Plug (2006)] and only a few studies have tried to empirically assess the effect of non-cognitive skills on educational outcomes. Two of the most interesting works on this topic are Heckman et al. (2006) and Segal (2006). The former uses two non-cognitive measures (the Rotter Locus of Control Scale and the Rosenberg Self-Esteem Scale) to construct a latent factor which is assumed to capture non-cognitive ability; and in Segal (2006) the non-cognitive skills are measured by a principal component variable which was constructed using the teacher evaluations of student behaviour - namely absenteeism, disruptiveness, inattentiveness, tardiness and homework completion.

Our approach is fundamentally different from the one followed in Heckman et al. (2006), as our goal is not to construct a latent uni-dimensional vector of non-cognitive skills, but to find one non-cognitive skill that, hopefully, has a strong association with educational outcomes. In other words, we are going to be looking at the importance of particular non-cognitive skill for educational success while Heckman et al. (2006) aim at capturing

the effect of non-cognitive skills with one single measure.

After exploring a few possible explanations for her results, Segal (2006) dismisses the possibility that either taste for education or occupation are the channels through which 8th grade misbehaviour correlates with educational attainment and earnings. Instead, the author suggests that 8th grade misbehaviour could be a proxy for one's ability to follow rules and therefore it is related with one's type. Segal is looking at a particular facet of Conscientiousness: to be rule-abiding. Perhaps that is why she does not find a strong correlation between 8th grade misbehaviour and what she interprets as taste for education.

In this paper we use insights from Five-factor model of personality to construct a measure of non-cognitive ability which is labeled 'attitude towards learning'. This variable should be a better proxy for taste for education because it does not rely on that facet of Conscientiousness alone. We agree that 'attitude towards learning' can be seen as a manifestation of Conscientiousness, and as a proxy for taste for education. That is the non-cognitive skill we are most interested in as a determinant of educational attainment, and it is its development that we are going to focus on when studying the formation of non-cognitive skills.

Inspired on the famous 1996 Coleman Report, Carneiro and Heckman (2003) say "schools work with what parents bring them". The literature surely recognizes family as a major determinant of children's educational attainment but it looks essentially at family background (parental income and education) and not directly at parental investments. The underlying assumption has been that parental education and income are good proxies for parental investments. Given that the literature has not yet come to a consensus about whether the relationship between parents' and chil-

dren's education is causal or not, it is particularly important to know which parental investments might foster children's educational success.

The model we use is inspired on Cunha and Heckman (2007). In that paper, the authors develop a model where parents directly shape child preferences by investing in the development of their cognitive and non-cognitive skills. So, their model provides a suitable theoretical framework for thinking about the two issues we are interested in studying: the role of non-cognitive skills in educational attainment, and the role of upbringing and child-rearing practices both on educational outcomes and on the development of children's non-cognitive skills. We estimate a simpler version of the model that assumes only two childhood stages. The model consists of two estimating equations: an education production equation and a skills formation equation. The results show that a positive 'attitude towards learning' shows a strong and statistically significant association with educational attainment, and that what parents do matters.