Chapter 3

Skills that foster lifetime success

This chapter details the impact of raising children's cognitive, social and emotional skills on their future outcomes in nine OECD countries. The empirical analyses show consistent patterns although they were based on longitudinal data from a variety of countries using different measures of skills and outcomes of children across different ages. Increasing deciles of cognitive skills has a strong impact on enhancing access to education and labour market outcomes, while increasing deciles of social and emotional skills has a strong impact on improving social outcomes such as health, experience of anti-social behaviour and subjective well-being. Some interventions designed to increase skills among disadvantaged children have shown impressive long-term results for social outcomes. Successful interventions tend to focus on raising skills that enable people to achieve goals, work with others and manage emotions, with conscientiousness, sociability and emotional stability appearing particularly important. Policy makers interested in better enhancing diverse measures of individual well-being and social progress may consider tapping into this area of skill development.

Introduction

This chapter details the impact of raising deciles of children's cognitive, social and emotional skills on their future outcomes in nine OECD countries, using a variety of measures.[1] The results show that while enhancing social and emotional skills shows moderate impact on education and labour market outcomes, doing so has a large impact on a variety of measures of social outcomes and enhancing socio-emotional skills generally outperforms the impact of raising cognitive skills.[2] The extraordinary power of social and emotional skills is explained in part by their role in shaping individuals' behaviours and lifestyles, which in turn shape their socio-economic outcomes. Social and emotional skills can also enhance the benefits of individuals attending tertiary education as well as raise their capacity to translate intentions into actions. While there is limited causal evidence on the types of social and emotional skills that matter, this chapter suggests that the social and emotional skills that raise children's capacities to achieve goals, work with others and manage their emotions are considered among the important drivers of their lifetime success. The particular skills involved in these processes include perseverance, sociability and self-esteem.

Wider benefits of skills

Cognitive skills have a high impact on tertiary education attendance and completion, and on labour market outcomes

The OECD's longitudinal analyses identify the socio-economic returns to investing in skills using latent factor models and counterfactual experiments (Box 3.1).

Figure 3.1 presents the simulated impact of raising skill deciles on tertiary attendance. While the effects vary in scale across countries, they generally suggest that the impact of raising cognitive skills (black/grey) on attending, enrolling or completing tertiary education outweighs the corresponding impact of raising social and emotional skills (blue). For example, in Figure 3.1 (Panel B), an increase in cognitive skills (based on measures of achievement test scores and school grades) of a 14-year-old Korean student from the lowest to the highest decile increases attendance in a four-year college by 23 percentage points, while the corresponding effects of increasing social and emotional skills (based on measures of locus of control[3]) is only 10 percentage points. The effect of cognitive skills is particularly strong for Norway (Panel C), Sweden (Panel D) and the United States (Panel E). Note that the impact of raising social and emotional skills on tertiary attendance tends to be either statistically insignificant or very close to zero. This is the case for Korea (Panel B, responsibility and locus of control), Norway (Panel C, extraversion and self-confidence), Sweden (Panel D) and United States (Panel E). For Belgium (Panel A), the impact of raising social and emotional skills on tertiary attendance rivals that of raising cognitive skills which is similar to recent evidence from the United States (Heckman, Humphries and Veramendi, 2014).

Figure 3.2 also shows the positive effect of cognitive skills on tertiary education completion observed in Canada (Panel A), Switzerland (Panel B), the United Kingdom (Panel C) and the United States (Panel D).

Box 3.1. OECD's longitudinal analyses on the effects of skills and the causal process of skill formation

In 2012, the OECD's Education and Social Progress (ESP) project conducted longitudinal analyses for 11 OECD countries, including Australia, Belgium (Flanders), Canada, Germany, Korea, New Zealand, Norway, Sweden, Switzerland, the United Kingdom and the United States. The aim was to identify: 1) the effects of skills on a variety of socioeconomic outcomes; and 2) the causal process of skill formation with past skills interacting with new learning investments. Results from nine countries, including Belgium (Flemish Community), Canada, Korea, New Zealand, Norway, Sweden, Switzerland, the United Kingdom and the United States, are presented in this report.

The study was based on the following longitudinal data sets identified by the OECD, based on the availability of appropriate measures of skills, learning contexts and outcomes (education, labour market and social):

- Australia — Longitudinal Survey of Australian Children (LSAC), Australian Temperament Project (ATP)
- Belgium — Longitudinal Research in Secondary Education (LOSO)
- Canada — Youth in Transition Study (YITS)
- Germany — Mannheim Study of Youth (MARS)
- Korea — Korean Youth Panel Studies (KYPS)
- New Zealand — Competent Children (CC)
- Norway — Young in Norway (YiN)
- Sweden — Evaluation Through Follow-up (ETF)
- Switzerland — Transition from Education to Employment (TREE)
- United Kingdom — British Cohort Study (BCS)
- United States — Early Childhood Longitudinal Study – Kindergarten (ECLS-K), National Longitudinal Study of Youth (NLSY)

The OECD adopted latent (dynamic) factor models as described in Urzua and Veramendi (2012), and Sarzosa and Urzua (2014). These models follow Heckman, Stixrud and Urzua (2006); Cunha and Heckman (2008); and Cunha, Heckman and Schennach (2012). They take into account measurement errors inherent in available measures of cognitive, social and emotional skills, as well as endogeneity of learning investment measures (i.e. that past levels of skills affect the amount of investments a child would receive). Skill measures precede outcome measures, and investment measures precede skill measures. Outputs that describe the returns to skills are generated using maximum likelihood estimation (MLE) and simulations to generate counter-factual measures of skills and outcomes. This report presents key results from selected countries (i.e. Belgium, Canada, Korea, New Zealand, Norway, Sweden, Switzerland, the United Kingdom and the United States) and data sets. Detailed country analyses, empirical models and estimation strategies will be published on the OECD's website (http://www.oecd.org/edu/ceri/educationandsocialprogress.htm) from February 2015.

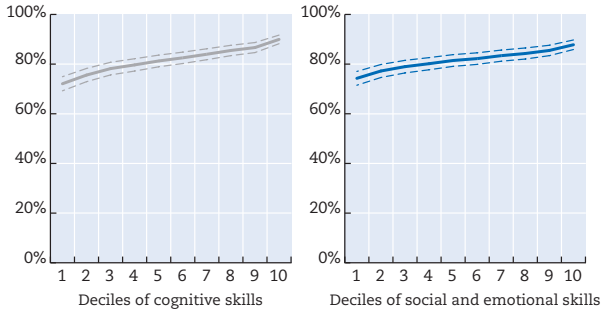
This study was designed and co-ordinated by the OECD and developed with a team of researchers around the world, including Sergio Urzua, Miguel Sarzosa and Ricardo Espinoza (University of Maryland, United States); Ben Edwards and Galina Daraganova (Australian Institute for Family Studies, Australia); Steven Groenez (University of Leuven, Belgium); Ross Finnie and Stephen Childs (University of Ottawa, Canada); Michael Kottelenberg and Steve Lehrer (Queen University, Canada); Friedhelm Pfeiffer and Karsten Reuss (Centre for European Economic Research, Germany); Lihong Huang (Oslo and Akershus University of Applied Sciences, Norway); Jan-Eric Gustafsson and Elias Johannesson (Gothenburg University, Sweden); and Robin Samuel (University of Basel, Switzerland).

Although the OECD's longitudinal analyses adopted a unified empirical strategy to estimate the drivers and outcomes of skills consistently across countries, the micro-data used are based on longitudinal studies that have different structures, measurements, control variables,[4] and age groups. Thus the figures presented in Chapters 3 and 4 are designed to generate overall patterns of the returns and outcomes of skills based on within-country analysis.

Figure 3.1. Cognitive skills have a high impact on tertiary-education attendance

Panel A. **Belgium (Flemish Community)**

Probability of self-reported tertiary education attendance by skill deciles

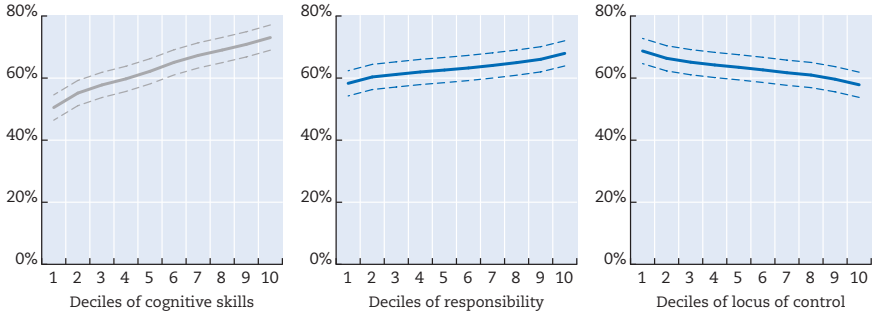


StatLink http://dx.doi.org/10.1787/888933163676

Note: Solid lines depict probability of self-reported college attendance, and dotted lines, 2.5-97.5% confidence intervals. Results are based on the OECD's longitudinal analyses (Box 3.1). Cognitive skills are captured by a latent cognitive skill factor estimated using measures of numerical, spatial and verbal intelligence quotient (IQ) tests during Grade 6. Social and emotional skills are captured by a latent social and emotional skill factor estimated using measures of extraversion, self-esteem and conscientiousness during Grade 6.

Panel B. **Korea**

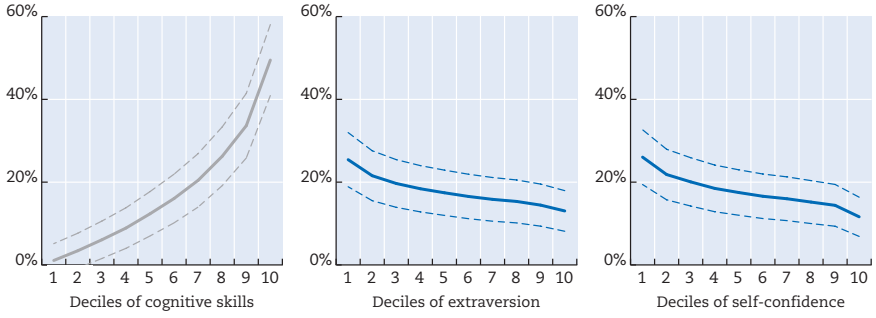
Probability of self-reported college attendance by skill deciles



Note: Solid lines depict probability of self-reported four-year college attendance at age 19-20, and dotted lines, 2.5-97.5% confidence intervals. Results are based on the OECD's longitudinal analyses (Box 3.1). Social and emotional skills are captured by a latent responsibility factor estimated using measures of impulsiveness, despondency and apprehensiveness at age 14, and a latent locus of control factor estimated using measures of "confidence in making own decisions", "belief in one's capacity to deal with problems" and "belief in the capacity to take responsibility of one's own life" at age 14. Cognitive skills are captured by a latent cognitive skill factor estimated using measures of achievement test scores and academic grades at age 14, and conditioning on latent responsibility and locus of control factors. The empirical model assumes that measures of achievement test scores and academic grades are a function of latent cognitive and social and emotional skill factors.

Panel C. **Norway**

Probability of self-reported college attendance by skill deciles

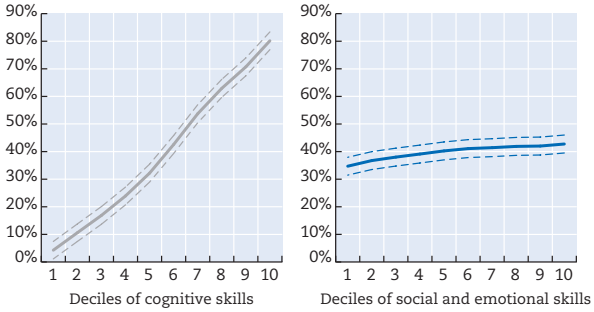


Note: Solid lines depict probability of self-reported college attendance at age 20-24, and dotted lines, 2.5-97.5% confidence intervals. Results are based on the OECD's longitudinal analyses (Box 3.1). Cognitive skills are captured by a latent cognitive skill factor estimated using measures of achievement tests, grades and self-rated academic competence at age 15-19. Social and emotional skills are captured by a latent extraversion factor estimated using measures of shyness, social acceptance and friendliness at age 15-19, and a latent self-confidence factor estimated using measures of self-satisfaction and confidence in oneself at age 15-19.

Figure 3.1. **Cognitive skills have a high impact on tertiary-education attendance** (continued)

Panel D. **Sweden**

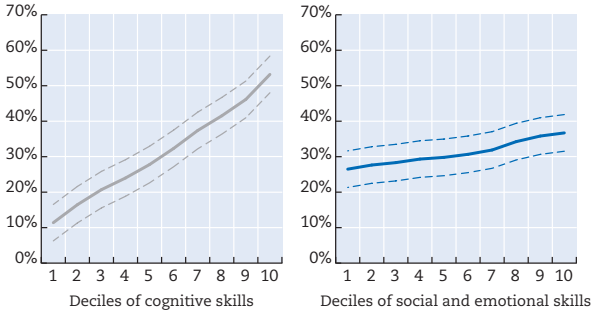
Probability of self-reported university attendance by skill deciles



Note: Solid lines depict probability of self-reported university attendance at age 20, and dotted lines, 2.5-97.5% confidence intervals. Results are based on the OECD's longitudinal analyses (Box 3.1). Cognitive skills are captured by a latent cognitive skill factor estimated using measures of maths grades, and special and verbal ability during Grade 3. Social and emotional skills are captured by a latent social and emotional skill factor estimated using measures of grit, social anxiety and social co-operation at Grade 3.

Panel E. **United States**

Probability of self-reported college attendance by skill deciles

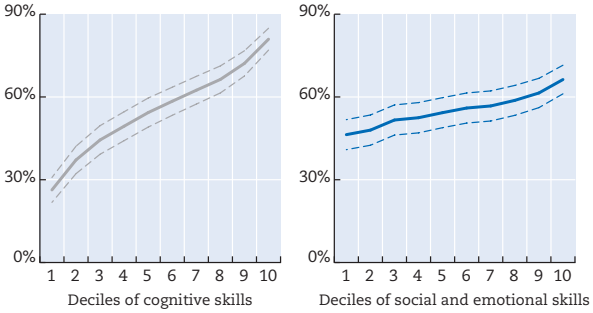


Note: Solid lines depict probability of self-reported four-year college attendance at age 20, and dotted lines, 2.5-97.5% confidence intervals. Results are based on the OECD's longitudinal analyses (Box 3.1). The sample is limited to white males. Cognitive skills are captured by a latent cognitive skill factor estimated using measures of mathematical knowledge, numerical operations and coding speed. Social and emotional skills are captured by a latent social and emotional skill factor estimated using measures of self-esteem (Rosenberg Scale) and locus of control (Rotter Scale). These measures were collected before children left high school.

Figure 3.2. **Cognitive skills have a high impact on completion of tertiary education**

Panel A. **Canada**

Probability of self-reported university completion by skill deciles



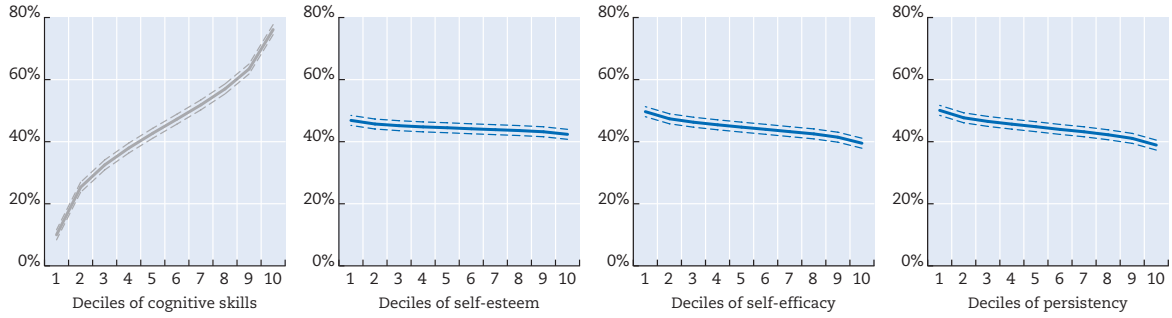
StatLink http://dx.doi.org/10.1787/888933163681

Note: Solid lines depict probability of self-reported university completion at age 25, and dotted lines, 2.5-97.5% confidence intervals. Results are based on the OECD's longitudinal analyses (Box 3.1). Cognitive skills are captured by a latent cognitive skill factor estimated using measures of PISA reading, maths and science scores at age 15. Social and emotional skills are captured by a latent social and emotional skill factor estimated using measures of self-efficacy, sense of mastery and self-esteem at age 15.

Figure 3.2. **Cognitive skills have a high impact on completion of tertiary education** (continued)

Panel B. **Switzerland**

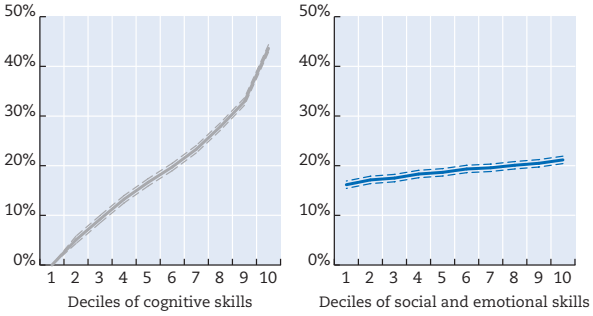
Probability of self-reported tertiary education completion by skill deciles



Note: Solid lines depict probability of self-reported tertiary education completion at age 25, and dotted lines, 2.5-97.5% confidence intervals. Results are based on the OECD's longitudinal analyses (Box 3.1). Cognitive skills are captured by a latent cognitive skill factor estimated using measures of PISA reading, maths and science scores at age 15. Social and emotional skills are captured by a latent self-esteem factor estimated using measures of self-satisfaction, "acknowledgement of own good qualities" and "confidence in doing things well" at age 16; a latent self-efficacy factor estimated using measures of "confidence in one's capacity to solve difficult problems when making efforts", "confidence in handling whatever comes in his/her way", and "confidence in dealing efficiently during unexpected events" at age 16; and a latent persistence factor estimated using measures of "orientation towards goal achievement", rigorousness and meticulousness at age 16.

Panel C. **United Kingdom**

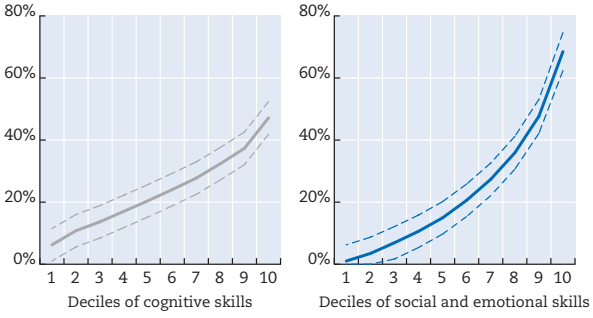
Probability of self-reporting tertiary education completion by skill deciles



Note: Solid lines depict probability of self-reporting tertiary education completion at age 26, and dotted lines, 2.5-97.5% confidence intervals. Results are based on the OECD's longitudinal analyses (Box 3.1). Cognitive skills are captured by a latent cognitive skill factor estimated using measures of general cognitive ability at age 10. Social and emotional skills are captured by a latent social and emotional skill factor estimated using measures of self-esteem, locus of control and persistence at age 10.

Panel D. **United States**

Probability of self-reported college completion by skill deciles

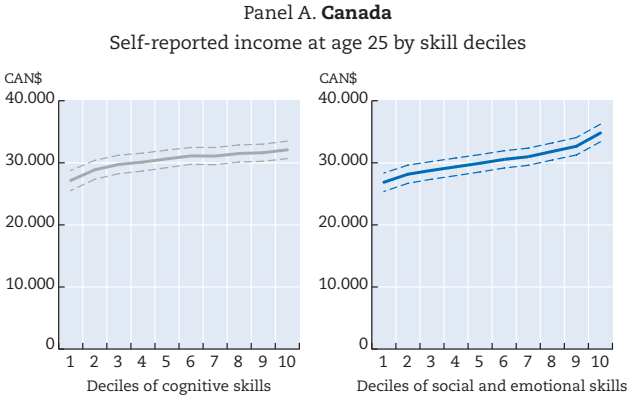


Note: Solid lines depict probability of self-reported four-year college completion, and dotted lines, 2.5-97.5% confidence intervals. Results are based on the OECD's longitudinal analyses (Box 3.1). The sample is limited to white males with at least a high-school degree or a GED (high-school equivalent) diploma. Cognitive skills are captured by a latent cognitive skill factor estimated using measures of mathematical knowledge, numerical operations and coding speed. Social and emotional skills are captured by a latent social and emotional skill factor estimated using measures of self-esteem (Rosenberg Scale) and locus of control (Rotter Scale). These measures were assessed before individuals left high school.

The strong impact of cognitive skills on tertiary education attendance may be a direct consequence of selection mechanisms in which access to higher education depends on high-school graduation certificates, grades and achievement tests. Once individuals gain eligibility to enrol in higher education, social and emotional skills may play a particularly important role in allowing them to persist through education. To see this, Figure 3.2 (Panel D) presents the impact of cognitive and social and emotional skills on completing four years of college in the United States among those who have already finished high school or gained a certificate of high-school equivalency. Among these students, the impact of raising student's social and emotional skills is much stronger than that of raising cognitive skills. This result is consistent with the literature (Heckman, Stixrud and Urzua, 2006; Heckman, Humphries and Veramendi, 2014).

Figure 3.3 presents the simulated impact of raising skill deciles on income and employment. They generally suggest that raising cognitive skills (grey) outweighs raising social and emotional skills (blue), with the exception of Canada (Panel A) and the United Kingdom (Panel F). For Norway (Panel B), moving a secondary school student from the lowest to the highest cognitive skill decile increases his/her likelihood of reaching the top quartile income bracket by 33 percentage points, while the effect of moving these adolescents from the lowest to the highest social and emotional skill (self-confidence) decile is limited to 8 percentage points. The effects of cognitive skills on income and unemployment are particularly strong for Norway (Panels B and E), Sweden (Panel C) and Switzerland (Panel D). The literature provides similar results (Heckman, Stixrud and Urzua, 2006; Heckman, Humphries and Veramendi, 2014). These results may be a direct consequence of selection mechanisms in which employers make hiring and initial salary decisions based on an individual's academic background which can be driven by cognitive ability.

Figure 3.3. **Cognitive skills have a high impact on income and unemployment**



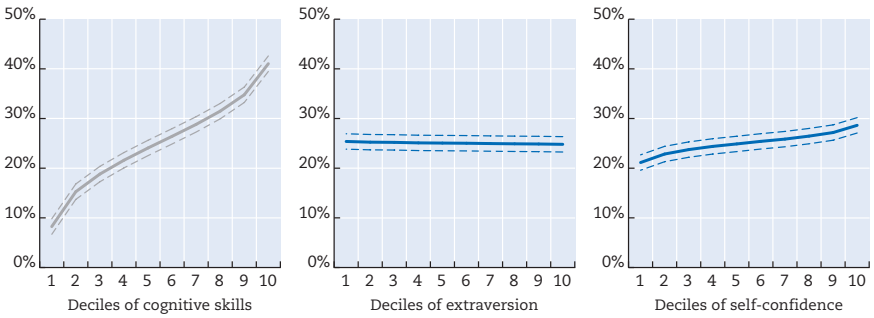
StatLink http://dx.doi.org/10.1787/888933163696

Note: Solid lines depict self-reported income at age 25, and dotted lines, 2.5-97.5% confidence intervals. Results are based on the OECD's longitudinal analyses (Box 3.1). Cognitive skills are captured by a latent cognitive skill factor estimated using measures of PISA reading, maths and science scores at age 15. Social and emotional skills are captured by a latent social and emotional skill factor estimated using measures of self-efficacy, sense of mastery and self-esteem at age 15.

Figure 3.3. **Cognitive skills have a high impact on income and unemployment** (continued)

Panel B. **Norway**

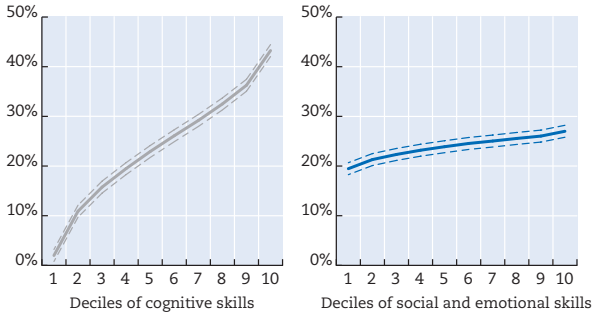
Probability of being in the top income quartile at age 26-31, based on self-reports, by skill deciles



Note: Solid lines depict the probability of being in the top income quartile based on self-reports, at age 26-31, and dotted lines, 2.5-97.5% confidence intervals. Results are based on the OECD's longitudinal analyses (Box 3.1). Cognitive skills are captured by a latent cognitive skill factor estimated using measures of achievement tests, grades and self-rated academic competence at age 15-19. Social and emotional skills are captured by a latent extraversion factor estimated using measures of shyness, social acceptance and friendliness at age 15-19, and a latent self-confidence factor estimated using measures of self-satisfaction and confidence in oneself at age 15-19. Income measures are self-reported.

Panel C. **Sweden**

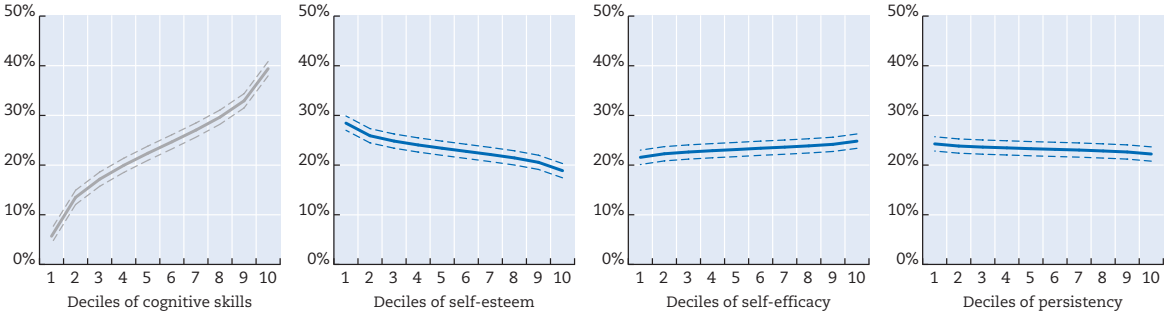
Probability of being in the top income quartile at age 30, based on self-reports, by skill deciles



Note: Solid lines depict the probability of being in the top income quartile based on self-reports at age 30, and dotted lines, 2.5-97.5% confidence intervals. Results are based on the OECD's longitudinal analyses (Box 3.1). Cognitive skills are captured by a latent cognitive skill factor estimated using measures of maths grades and special and verbal ability during Grade 3. Social and emotional skills are captured by a latent social and emotional skill factor estimated using measures of grit, social anxiety and social co-operation during Grade 3. Income measures are self-reported.

Panel D. **Switzerland**

Probability of being in the top earnings quartile at age 25, based on self-reports, by skill deciles

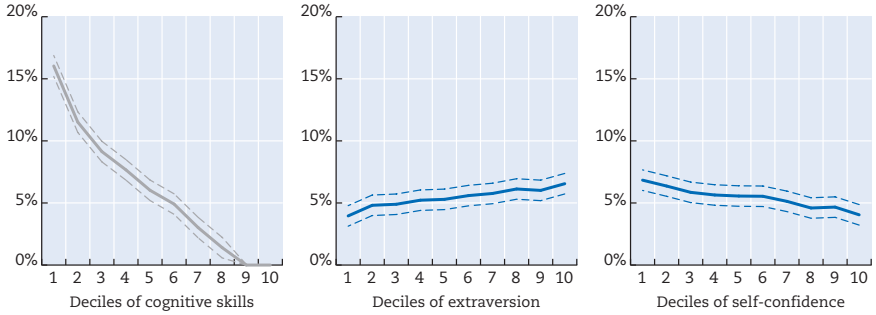


Note: Solid lines depict the probability of being in the top earnings quartile (full-time equivalent) at age 25, and dotted lines, 2.5-97.5% confidence intervals. Results are based on the OECD's longitudinal analyses (Box 3.1). Cognitive skills are captured by a latent cognitive skill factor estimated using measures of PISA reading, maths and science scores at age 15. Social and emotional skills are captured by a latent self-esteem factor estimated using measures of self-satisfaction, "acknowledgement of own good qualities" and "confidence in doing things well" at age 16; a latent self-efficacy factor estimated using measures of "confidence in one's capacity to solve difficult problems when making efforts", "confidence in handling whatever comes in his/her way", and "confidence in dealing efficiently during unexpected events" at age 16; and a latent persistence factor estimated using measures of "orientation towards goal achievement", rigorousness and meticulousness at age 16. Earning measures are self-reported.

Figure 3.3. **Cognitive skills have a high impact on income and unemployment** (continued)

Panel E. **Norway**

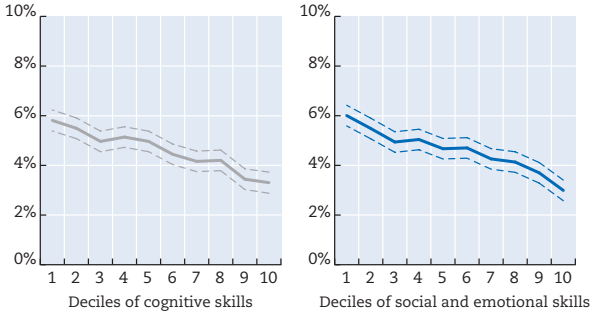
Probability of self-reported unemployment at age 26-31 by skill deciles



Note: Solid lines depict the probability of self-reported unemployment at age 26-31, and dotted lines, 2.5-97.5% confidence intervals. Results are based on the OECD's longitudinal analyses (Box 3.1). Cognitive skills are captured by a latent cognitive skill factor estimated using measures of achievement tests, grades and self-rated academic competence at age 15-19. Social and emotional skills are captured by a latent extraversion factor estimated using measures of shyness, social acceptance and friendliness at age 15-19, and a latent self-confidence factor estimated using measures of self-satisfaction and confidence in oneself at age 15-19.

Panel F. **United Kingdom**

Probability of self-reported unemployment at age 26 by skill deciles



Note: Solid lines depict the probability of self-reported unemployment at age 26, and dotted lines, 2.5-97.5% confidence intervals. Results are based on the OECD's longitudinal analyses (Box 3.1). Cognitive skills are captured by a latent cognitive skill factor estimated using measures of general cognitive ability during Grade 10. Social and emotional skills are captured by a latent social and emotional skill factor estimated using measures of self-esteem, locus of control and persistence during Grade 10.

Social and emotional skills have large effects on diverse social outcomes

Chapters 1, 2 and 5 make the case that the outcomes that matter for policy makers, teachers, parents and students are diverse, and far surpass educational attainment and labour market performance. Do social and emotional skills bring wider benefits? Figures 3.4 through 3.9 present the effects of increasing deciles of skills on a variety of social outcomes and subjective well-being. Figures 3.4, 3.5, 3.6 and 3.7 suggest that social and emotional skills play a particularly important role in improving health-related outcomes and reducing anti-social behaviour. Moreover, Figure 3.8 suggests that social and emotional skills help protect individuals from being victimised by aggressive behaviours. The figures suggest that the impact of raising social and emotional skills on improving social outcomes generally outweighs the corresponding impact of raising cognitive skills. These results are also consistent with those from similar studies (Heckman, Stixrud and Urzua, 2006; Heckman, Humphries and Veramendi, 2014).

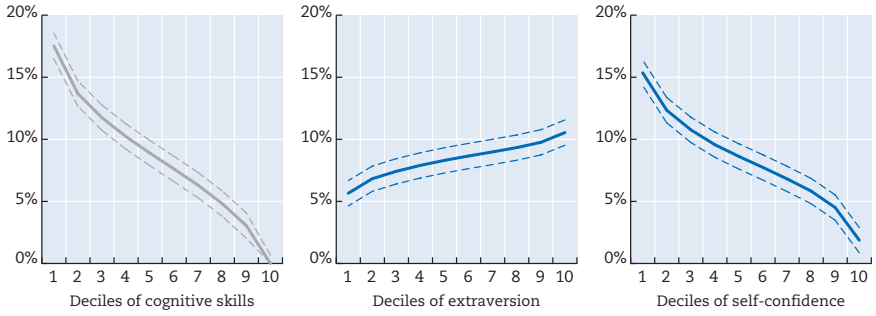
Figure 3.4 shows that the impact of raising social and emotional skills on reducing obesity rivals with the corresponding impact of raising cognitive skills. For the United Kingdom (Panel B), for example, moving a child from the lowest to the highest cognitive decile (based on measures of

general cognitive ability) reduces the likelihood of being obese at age 16 by 2 percentage points, while the effect of moving a child up the social and emotional skill deciles (based on measures of self-esteem, locus of control and persistence) reduces the likelihood of being obese by 3 percentage points. Similar effects are observed for the United States (Panel C), in which the impact on self-reported obesity of moving a child from the lowest to the highest skill deciles are 3 percentage points for both cognitive and social and emotional skills. The effect of raising social and emotional skills (self-confidence) on reducing self-reported obesity during adulthood is particularly strong for Norway (Panel A). This effect is comparable to the effect of raising cognitive skills. It is worthy to note the negative effect of raising extraversion on obesity, whereby an increase in the level of extraversion of a Norwegian child would lead to an increase in the likelihood of self-reported obesity.

Figure 3.4. **Social and emotional skills have a high impact on obesity**

Panel A. **Norway**

Probability of self-reported obesity at age 26-31 by skill deciles

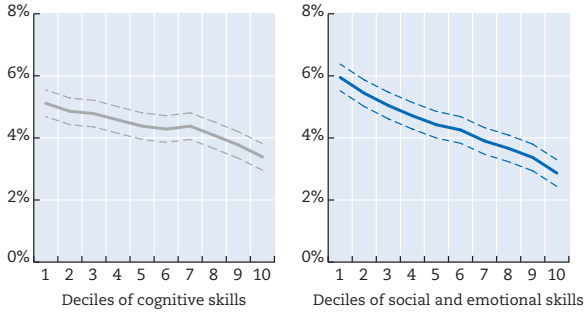


StatLink http://dx.doi.org/10.1787/888933163707

Note: Solid lines depict the probability of self-reported body mass index (BMI) greater than 30 (obese) at age 26-31, and dotted lines, 2.5-97.5% confidence intervals. Results are based on the OECD's longitudinal analyses (Box 3.1). Cognitive skills are captured by a latent cognitive skill factor estimated using measures of achievement tests, grades and self-rated academic competence at age 15-19. Social and emotional skills are captured by a latent extraversion factor estimated using measures of shyness, social acceptance and friendliness at age 15-19, and a latent self-confidence factor estimated using measures of self-satisfaction and confidence in oneself at age 15-19. Obesity is measured based on self-reported measures of weight and height and by identifying individuals with BMI>=30 during age 26-31.

Panel B. **United Kingdom**

Probability of being obese at age 16 by skill deciles

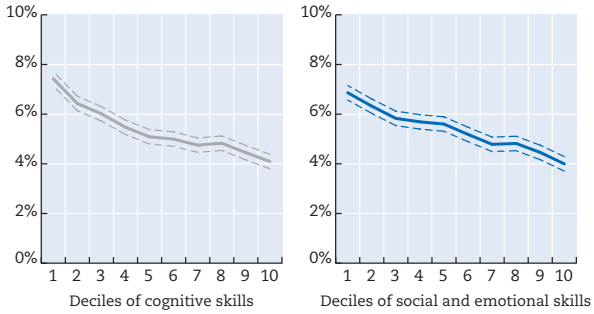


Note: Solid lines depict the probability of being diagnosed as obese at age 16, and dotted lines, 2.5-97.5% confidence intervals. Results are based on the OECD's longitudinal analyses (Box 3.1). Cognitive skills are captured by a latent cognitive skill factor estimated using measures of general cognitive ability during age 10. Social and emotional skills are captured by a latent social and emotional skill factor estimated using measures of self-esteem, locus of control and persistence during age 10. Obesity is captured using BMI calculated based on a medical examination of weight and height at age 16. A child whose BMI is equal to or exceeds 95th percentile of BMI is considered obese.

Figure 3.4. **Social and emotional skills have a high impact on obesity** (continued)

Panel C. **United States**

Probability of self-reported obesity at Grade 8 by skill deciles



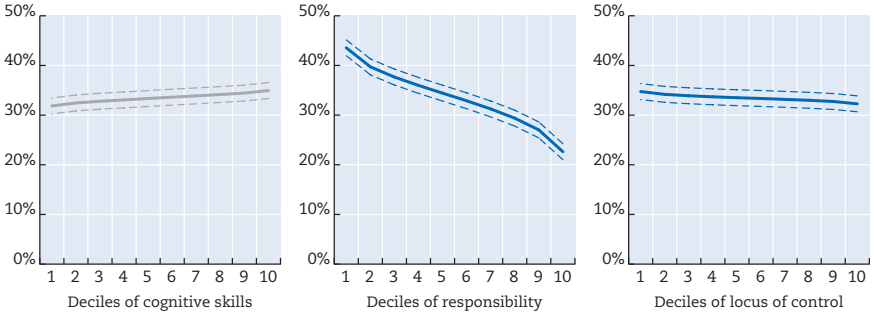
Note: Solid lines depict the probability of self-reported measures of BMI>=95 percentile during Grade 8, and dotted lines, 2.5-97.5% confidence intervals. Results are based on the OECD's longitudinal analyses (Box 3.1). Cognitive skills are captured by a latent cognitive skill factor estimated using measures of general cognitive ability during kindergarten. Social and emotional skills are captured by a latent social and emotional skill factor estimated using measures of self-control, approaches to learning and internalising behaviours during kindergarten. Obesity is captured by calculating BMI based on direct assessment of children's weight and height by trained interviewers at Grade 8.

Figure 3.5 shows that the impact of raising social and emotional skills on reducing the likelihood of individuals self-reporting experience of depression is stronger than the corresponding impact of raising cognitive skills, with the exception of Norway (Panel B). For Switzerland (Panel C), for example, the effect of moving a child from the lowest to the highest self-esteem decile reduces self-reported depression by 26 percentage points, while a similar effect of increasing cognitive skills is only 13 percentage points. The effect of social and emotional skills on self-reported depression is also particularly strong for Korea (Panel A) and the United Kingdom (Panel D). These results are also consistent with evidence from the United States (Heckman and Kautz, 2012).

Figure 3.5. **Social and emotional skills have a high impact on depression**

Panel A. **Korea**

Probability of self-reported depression at age 19 by skill deciles



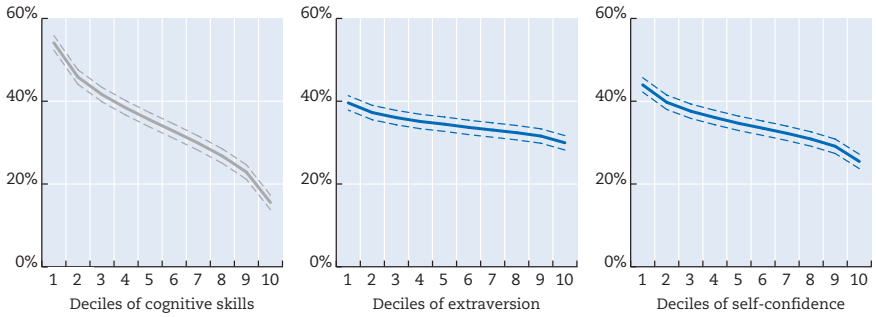
StatLink http://dx.doi.org/10.1787/888933163716

Note: Solid lines depict the probability of being in the top quartile of the Scale of Symptoms at age 19 based on self-reports, and dotted lines, 2.5-97.5% confidence intervals. Results are based on the OECD's longitudinal analyses (Box 3.1). Social and emotional skills are captured by a latent responsibility factor estimated using measures of impulsiveness, despondency and apprehensiveness at age 14; and a latent locus of control factor estimated using measures of "confidence in making own decisions", "belief in one's capacity to deal with problems" and "belief in the capacity to take responsibility of one's own life" at age 14. Cognitive skills are captured by a latent cognitive skill factor estimated using measures of achievement test scores and academic grades at age 14, and conditioning on latent responsibility and locus of control factors. The empirical model assumes that measures of achievement test scores and academic grades are a function of latent cognitive and social and emotional skill factors.

Figure 3.5. **Social and emotional skills have a high impact on depression** (continued)

Panel B. **Norway**

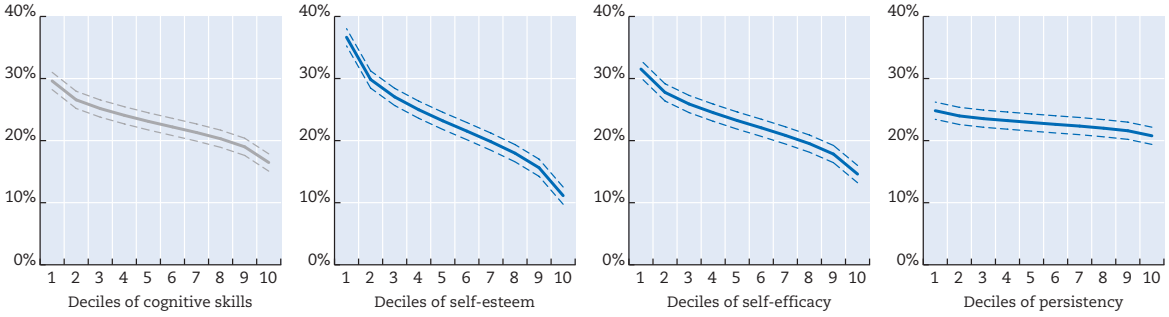
Probability of self-reported depression at age 26-31 by skill deciles



Note: Solid lines depict the probability of being in the top quartile of the Depressive Mood Inventory scale based on self-reports at age 26-31, and dotted lines, 2.5-97.5% confidence intervals. Results are based on the OECD's longitudinal analyses (Box 3.1). Cognitive skills are captured by a latent cognitive skill factor estimated using measures of achievement tests, grades and self-rated academic competence at age 15-19. Social and emotional skills are captured by a latent extraversion factor estimated using measures of shyness, social acceptance and friendliness at age 15-19, and a latent self-confidence factor estimated using measures of self-satisfaction and confidence in oneself at age 15-19.

Panel C. **Switzerland**

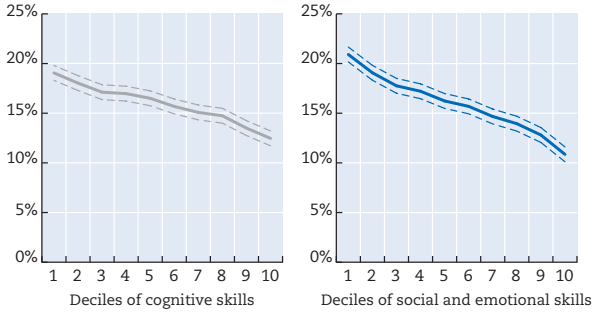
Probability of self-reported depression at age 25 by skill deciles



Note: Solid lines depict the probability of being in the top quartile of a depression scale at age 25 based on self-reports, and dotted lines, 2.5-97.5% confidence intervals. Results are based on the OECD's longitudinal analyses (Box 3.1). Cognitive skills are captured by a latent cognitive skill factor estimated using measures of PISA reading, maths and science scores at age 15. Social and emotional skills are captured by a latent self-esteem factor estimated using measures of self-satisfaction, "acknowledgement of own good qualities" and "confidence in doing things well" at age 16; a latent self-efficacy factor estimated using measures of "confidence in one's capacity to solve difficult problems when making efforts", "confidence in handling whatever comes in his/her way", and "confidence in dealing efficiently during unexpected events" at age 16; and a latent persistence factor estimated using measures of "orientation towards goal achievement", rigorousness and meticulousness at age 16. The depression scale was constructed using self-reported measures of positive and negative affectivity.

Panel D. **United Kingdom**

Probability of self-reported depression at age 16 by skill deciles

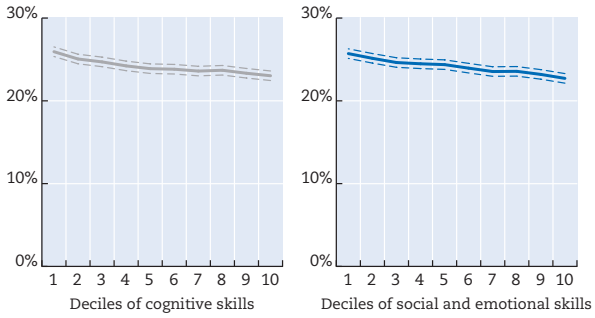


Note: Solid lines depict the probability of self-reported depression at age 16, and dotted lines, 2.5-97.5% confidence intervals. Results are based on the OECD's longitudinal analyses (Box 3.1). Cognitive skills are captured by a latent cognitive skill factor estimated using measures of general cognitive ability at age 10. Social and emotional skills are captured by a latent social and emotional skill factor estimated using measures of self-esteem, locus of control and persistence at age 10. Depression is identified using Malaise score of 15 or higher.

Figure 3.5. **Social and emotional skills have a high impact on depression** (continued)

Panel E. **United States**

Probability of self-reported depression at Grade 8 by skill deciles



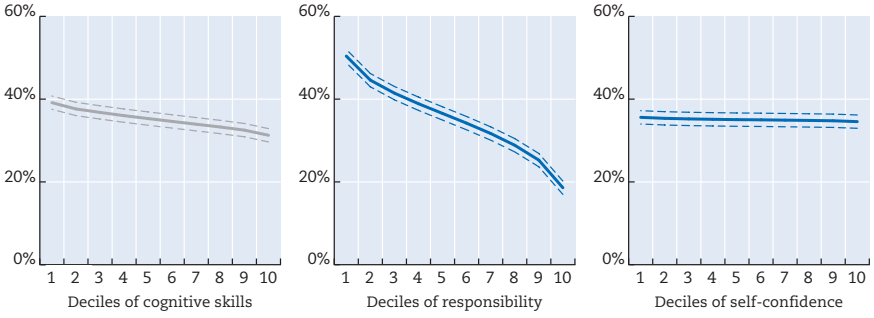
Note: Solid lines depict the probability of self-reported experience of depression at least "some of the time" during Grade 8, and dotted lines, 2.5-97.5% confidence intervals. Results are based on the OECD's longitudinal analyses (Box 3.1). Cognitive skills are captured by a latent cognitive skill factor estimated using measures of general cognitive ability during kindergarten. Social and emotional skills are captured by a latent social and emotional skill factor estimated using measures of self-control, approaches to learning and internalising behaviours during kindergarten.

Figure 3.6 shows that the impact of raising social and emotional skills on reducing the likelihood of individuals self-reporting experience of engaging in conduct problems is stronger than the corresponding impact of raising cognitive skills, with the exception of the United Kingdom (Panel D). For New Zealand (Panel B), the effect of moving an 8-year-old child from the lowest to the highest social and emotional skill deciles (based on measures of perseverance, responsibility and social skills with respect to peers in the community) reduces self-reported engagement in conduct problems (drinking, smoking, substance abuse, violence and fights) at age 16 by 15 percentage points, while a similar effect of increasing cognitive skills is statistically insignificant. The effect of social and emotional skills on conduct problems is also particularly strong for Korea (responsibility, Panel A) and Switzerland (self-esteem and self-efficacy, Panel C).

Figure 3.6. **Social and emotional skills have a high impact on conduct (behaviour) problems**

Panel A. **Korea**

Probability of self-reported conduct problems at age 15 by skill deciles



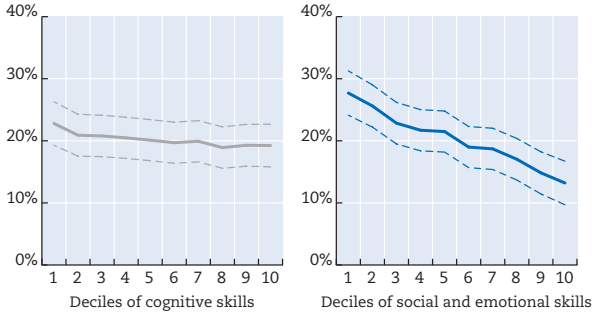
StatLink http://dx.doi.org/10.1787/888933163728

Note: Solid lines depict the probability at the age of 15 participating in severely beating up others, gang fighting, robbing, stealing, teasing or bantering, threatening or bullying during the past year, based on self-reports, and dotted lines, 2.5-97.5% confidence intervals. Results are based on the OECD's longitudinal analyses (Box 3.1). Social and emotional skills are captured by a latent responsibility factor estimated using measures of impulsiveness, despondency and apprehensiveness at age 14; and a latent locus of control factor estimated using measures of "confidence in making own decisions", "belief in one's capacity to deal with problems" and "belief in the capacity to take responsibility of one's own life" at age 14. Cognitive skills are captured by a latent cognitive skill factor estimated using measures of achievement test scores and academic grades at age 14, and conditioning on latent responsibility and locus of control factors. The empirical model assumes that measures of achievement test scores and academic grades are a function of latent cognitive and social and emotional skill factors.

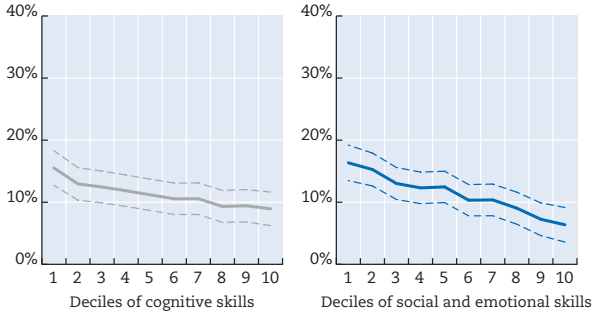
Figure 3.6. **Social and emotional skills have a high impact on conduct (behaviour) problems** (continued)

Panel B. **New Zealand**

Probability of self-reported conduct problems at age 16 by skill deciles



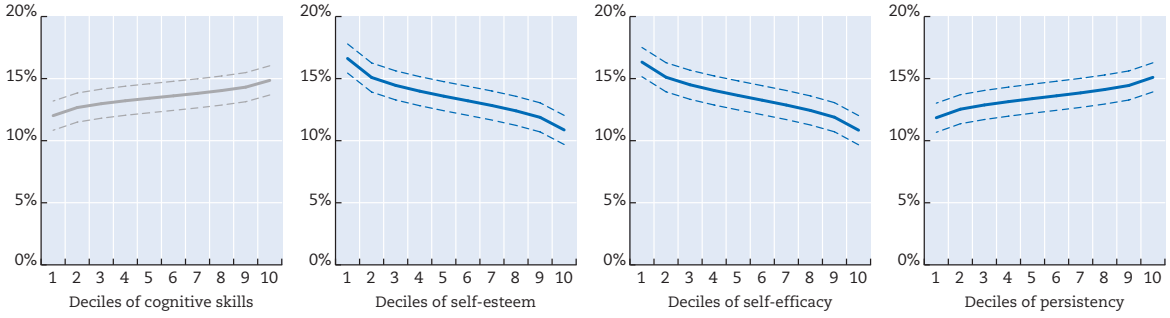
Probability of self-reported conduct problems at age 20 by skill deciles



Note: Solid lines depict the probability of self-reported engagement in drinking, smoking, substance abuse, violence and fights at age 16 (upper panel) and self-reported engagement in marijuana usage and having trouble with police at age 20 (lower panel), and dotted lines, 2.5-97.5% confidence intervals. Results are based on the OECD's longitudinal analyses (Box 3.1). Cognitive skills are captured by a latent cognitive skill factor estimated using measures of achievement tests and problem-solving tests at age 8. Social and emotional skills are captured by a latent social and emotional skill factor estimated using measures of perseverance, responsibility and social skills at age 8.

Panel C. **Switzerland**

Probability of self-reported conduct problems at age 17 by skill deciles

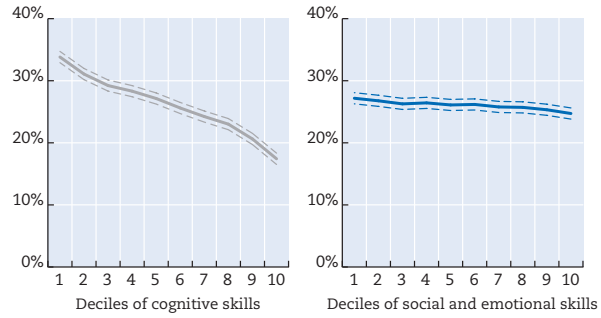


Note: Solid lines depict the probability of experiencing problems with the police and experiencing school delinquency at age 17 based on self-reports, and dotted lines, 2.5-97.5% confidence intervals. Results are based on the OECD's longitudinal analyses (Box 3.1). Cognitive skills are captured by a latent cognitive skill factor estimated using measures of PISA reading, maths and science scores at age 15. Social and emotional skills are captured by a latent self-esteem factor estimated using measures of self-satisfaction, "acknowledgement of own good qualities" and "confidence in doing things well" at age 16; a latent self-efficacy factor estimated using measures of "confidence in one's capacity to solve difficult problems when making efforts", "confidence in handling whatever comes in his/her way" at age 16, and "confidence in dealing efficiently during unexpected events"; and a latent persistence factor estimated using measures of "orientation towards goal achievement", rigorousness and meticulousness at age 16.

Figure 3.6. **Social and emotional skills have a high impact on conduct (behaviour) problems** (continued)

Panel D. **United Kingdom**

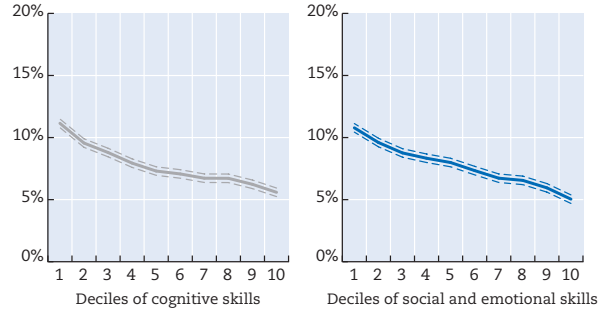
Probability of self-reported conduct problems at age 16 by skill deciles



Note: Solid lines depict the probability of self-reported engagement in high level of drinking or smoking at age 16, and dotted lines, 2.5-97.5% confidence intervals. Results are based on the OECD's longitudinal analyses (Box 3.1). Cognitive skills are captured by a latent cognitive skill factor estimated using measures of general cognitive ability at Grade 10. Social and emotional skills are captured by a latent social and emotional skill factor estimated using measures of self-esteem, locus of control and persistence.

Panel E. **United States**

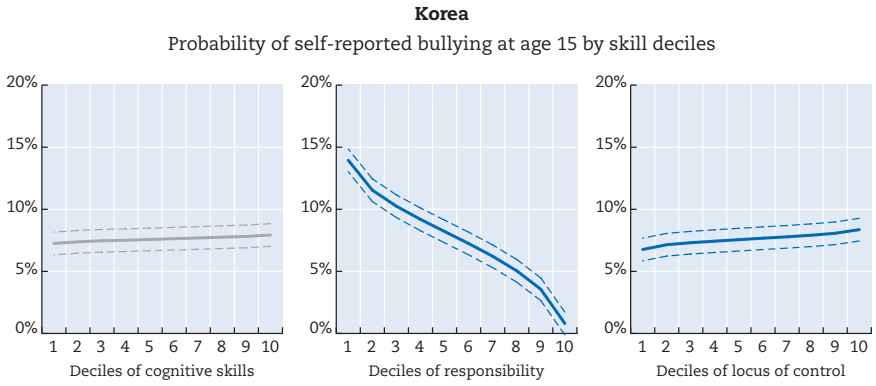
Probability of self-reported conduct problems at Grade 8 by skill deciles



Note: Solid lines depict the probability of self-reported engagement in fighting at Grade 8, and dotted lines, 2.5-97.5% confidence intervals. Results are based on the OECD's longitudinal analyses (Box 3.1). Cognitive skills are captured by a latent cognitive skill factor estimated using measures of general cognitive ability during kindergarten. Social and emotional skills are captured by a latent social and emotional skill factor estimated using measures of self-control, approaches to learning and internalising behaviours during kindergarten.

School bullying has become a major policy concern in many OECD countries and partner economies. Figure 3.7 sheds light on how skills affect students' aggressive behaviours in Korea, a country that faces considerable challenges with respect to this issue (Sarzosa and Urzua, 2013). It suggests that self-reported engagement in bullying is strongly driven by students' lack of responsibility. The effects of moving a 14-year-old Korean child from the lowest to the highest decile of responsibility reduces self-reported engagement in bullying at age 15 by 13 percentage points. In contrast, children's cognitive skills do not show any effect on self-reported engagement in bullying.

Figure 3.7. **Social and emotional skills have a high impact on bullying**

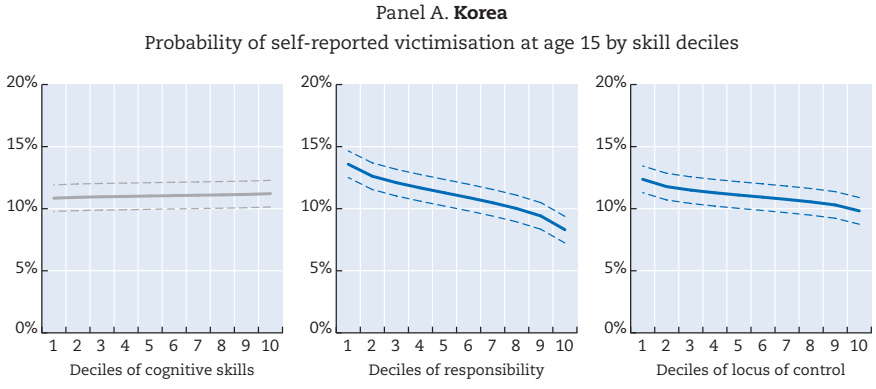


StatLink http://dx.doi.org/10.1787/888933163737

Note: Solid lines depict the probability at the age of 15 of self-reported experience of severely teasing or bantering, threatening or bullying others during the past year, and dotted lines, 2.5-97.5% confidence intervals. Results are based on the OECD's longitudinal analyses (Box 3.1). Social and emotional skills are captured by a latent responsibility factor estimated using measures of impulsiveness, despondency and apprehensiveness at age 14; and a latent locus of control factor estimated using measures of "confidence in making own decisions", "belief in one's capacity to deal with problems" and "belief in the capacity to take responsibility of one's own life" at age 14. Cognitive skills are captured by a latent cognitive skill factor estimated using measures of achievement test scores and academic grades at age 14, and conditioning on latent responsibility and locus of control factors. The empirical model assumes that measures of achievement test scores and academic grades are a function of latent cognitive and social and emotional skill factors.

Social and emotional skills may not only reduce the likelihood of children becoming the perpetrator of aggression, but also allow them to avoid being its victim. Figure 3.8 shows that the impact of raising social and emotional skills on reducing the likelihood of individuals self-reporting experience of being victimised is strong. For instance, Panel C suggests that the effects of moving a child attending kindergarten in the United States from the lowest to the highest decile of social and emotional skills (based on measures of self-control, approaches to learning and internalising behaviours) reduces the likelihood of being bullied during Grade 8 by 12 percentage points. Raising cognitive skills exhibits similar effects. For Korea (Panel A), while raising cognitive skills appears to have no effect on being bullied, increasing children's levels of responsibility from the lowest to the highest decile reduces the probability of being the victim of aggression by 5 percentage points.

Figure 3.8. **Social and emotional skills have a high impact on being victimised**



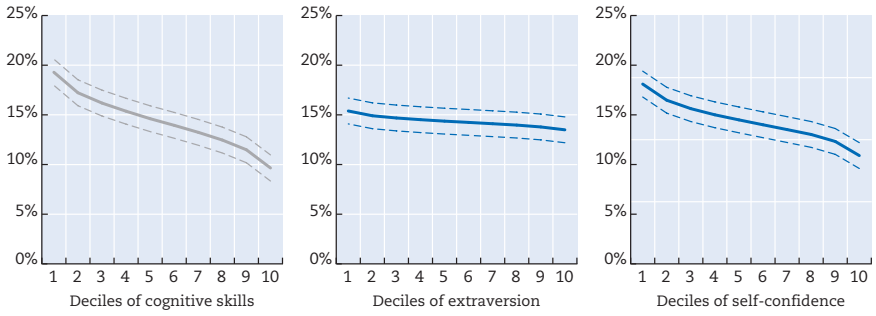
StatLink http://dx.doi.org/10.1787/888933163743

Note: Solid lines depict the probability at the age of 15 of self-reported experience of being robbed or kicked, and dotted lines, 2.5-97.5% confidence intervals. Results are based on the OECD's longitudinal analyses (Box 3.1). Results are based on the OECD's longitudinal analyses (Box 3.1). Social and emotional skills are captured by a latent responsibility factor estimated using measures of impulsiveness, despondency and apprehensiveness at age 14; and a latent locus of control factor estimated using measures of "confidence in making own decisions", "belief in one's capacity to deal with problems" and "belief in the capacity to take responsibility of one's own life" at age 14. Cognitive skills are captured by a latent cognitive skill factor estimated using measures of achievement test scores and academic grades at age 14, and conditioning on latent responsibility and locus of control factors. The empirical model assumes that measures of achievement test scores and academic grades are a function of latent cognitive and social and emotional skill factors.

Figure 3.8. **Social and emotional skills have a high impact on being victimised** (continued)

Panel B. **Norway**

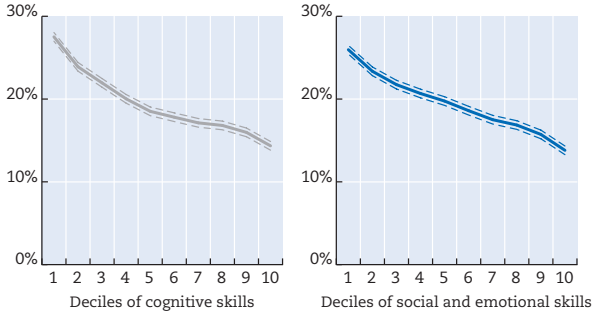
Probability of self-reported victimisation at age 15-19 by skill deciles



Note: Solid lines depict the probability at the age of 15-19 of self-reported experience of having been threatened with violence and/or received physical violence and assaults, and dotted lines, 2.5-97.5% confidence intervals. Results are based on the OECD's longitudinal analyses (Box 3.1). Cognitive skills are captured by a latent cognitive skill factor estimated using measures of achievement tests, grades and self-rated academic competence at age 15-19. Social and emotional skills are captured by a latent extraversion factor estimated using measures of shyness, social acceptance and friendliness, and a latent self-confidence factor estimated using measures of self-satisfaction and confidence in oneself at age 15-19.

Panel C. **United States**

Probability of self-reported experience of being bullied at Grade 8 by skill deciles



Note: Solid lines depict the probability of self-reported experience of having often been bullied during Grade 8, and dotted lines, 2.5-97.5% confidence intervals. Results are based on the OECD's longitudinal analyses (Box 3.1). Cognitive skills are captured by a latent cognitive skill factor estimated using measures of general cognitive ability during kindergarten. Social and emotional skills are captured by a latent social and emotional skill factor estimated using measures of self-control, approaches to learning and internalising behaviours during kindergarten.

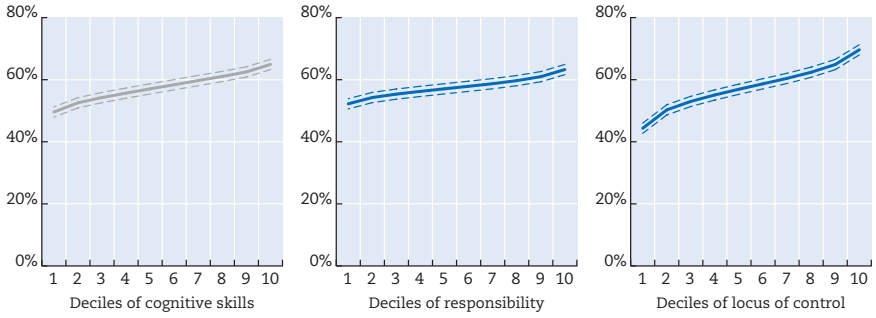
Social and emotional skills have a high impact on subjective well-being

Figure 3.9 presents the effects of raising skills from the lowest to the highest skill decile on subjective well-being measures (such as life satisfaction). The results suggest that raising social and emotional skills generally has a considerable impact on improving self-reported life-satisfaction, positive attitudes towards life and (un)happiness, and their effects on these outcomes largely outweigh the effects of raising cognitive skills. For example, the result for Switzerland (Panel C) shows raising self-efficacy at age 16 from the lowest to the highest decile has a large positive impact on positive attitudes towards life at age 25 (by 21 percentage points) while raising cognitive skills (based on PISA literacy measures) at age 15 exhibits large negative effects (by 16 percentage points). Results for Korea (Panel A), New Zealand (Panel B) and the United States (Panel E) also exhibit strong effects of raising social and emotional skills on increasing subjective measures of well-being (life satisfaction and happiness).

Figure 3.9. **Social and emotional skills have a high impact on life satisfaction**

Panel A. **Korea**

Probability of self-reported life satisfaction at age 19 by skill deciles

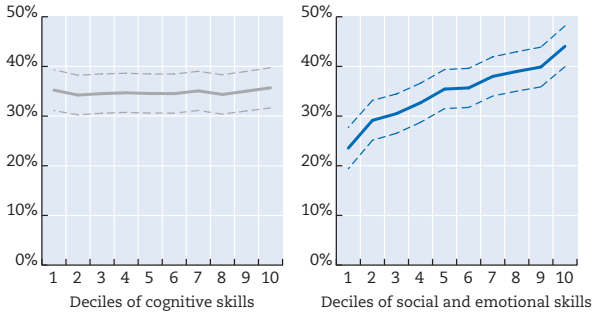


StatLink http://dx.doi.org/10.1787/888933163758

Note: Solid lines depict the probability of self-reported life satisfaction at age 19, and dotted lines, 2.5-97.5% confidence intervals. Results are based on the OECD's longitudinal analyses (Box 3.1). Social and emotional skills are captured by a latent responsibility factor estimated using measures of impulsiveness, despondency and apprehensiveness at age 14; and a latent locus of control factor estimated using measures of "confidence in making own decisions", "belief in one's capacity to deal with problems" and "belief in the capacity to take responsibility of one's own life" at age 14. Cognitive skills are captured by a latent cognitive skill factor estimated using measures of achievement test scores and academic grades at age 14, and conditioning on latent responsibility and locus of control factors. The empirical model assumes that measures of achievement test scores and academic grades are a function of latent cognitive and social and emotional skill factors.

Panel B. **New Zealand**

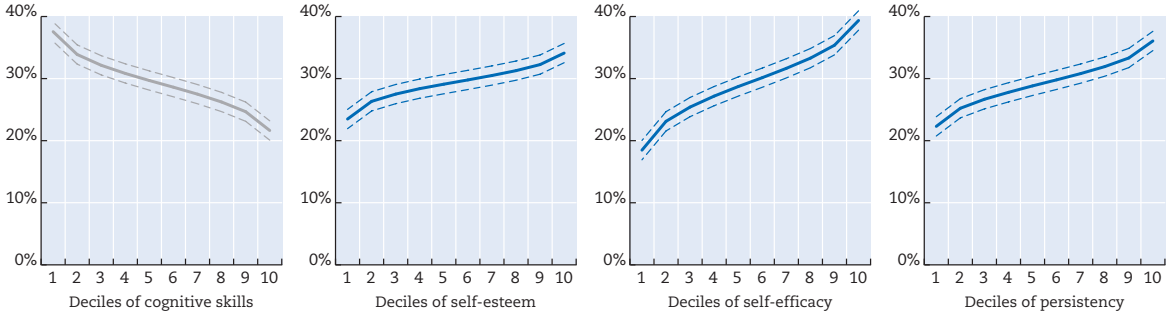
Probability of being very happy at age 20, based on self-reports, by skill deciles



Note: Solid lines depict the probability of being very happy at age 20 based on self-reports, and dotted lines, 2.5-97.5% confidence intervals. Results are based on the OECD's longitudinal analyses (Box 3.1). Cognitive skills are captured by a latent cognitive skill factor estimated using measures of achievement tests and problem-solving tests at age 8. Social and emotional skills are captured by a latent social and emotional skill factor estimated using measures of perseverance, responsibility and social skills.

Panel C. **Switzerland**

Probability of having positive attitudes towards life at age 25, based on self-reports, by skill deciles

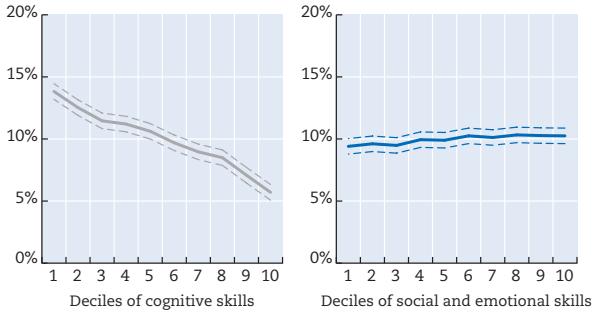


Note: Solid lines depict the probability of having positive attitudes towards life at age 25 based on self-reports, and dotted lines, 2.5-97.5% confidence intervals. Results are based on the OECD's longitudinal analyses (Box 3.1). Cognitive skills are captured by a latent cognitive skill factor estimated using measures of PISA reading, maths and science scores at age 15. Social and emotional skills are captured by a latent self-esteem factor estimated using measures of self-satisfaction, "acknowledgement of own good qualities" and "confidence in doing things well" at age 16; a latent self-efficacy factor estimated using measures of "confidence in one's capacity to solve difficult problems when making efforts", "confidence in handling whatever comes in his/her way" at age 16, and "confidence in dealing efficiently during unexpected events"; and a latent persistence factor estimated using measures of "orientation towards goal achievement", rigorousness and meticulousness at age 16.

Figure 3.9. **Social and emotional skills have a high impact on life satisfaction** (continued)

Panel D. **United Kingdom**

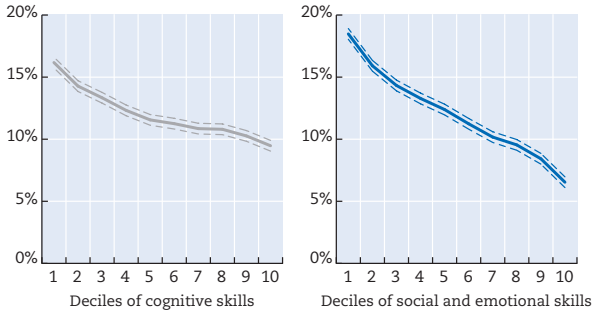
Probability of self-reported life satisfaction at age 26 by skill deciles



Note: Solid lines depict the probability of self-reported life satisfaction at age 26, and dotted lines, 2.5-97.5% confidence intervals. Results are based on the OECD's longitudinal analyses (Box 3.1). Cognitive skills are captured by a latent cognitive skill factor estimated using measures of general cognitive ability at age 10. Social and emotional skills are captured by a latent social and emotional skill factor estimated using measures of self-esteem, locus of control and persistence at age 10.

Panel E. **United States**

Probability of being unhappy at Grade 8, based on self-reports, by skill deciles



Note: Solid lines depict the probability of being unhappy at Grade 8 based on self-reports, and dotted lines, 2.5-97.5% confidence intervals. Results are based on the OECD's longitudinal analyses (Box 3.1). Cognitive skills are captured by a latent cognitive skill factor estimated using measures of general cognitive ability during kindergarten. Social and emotional skills are captured by a latent social and emotional skill factor estimated using measures of self-control, approaches to learning and internalising behaviours during kindergarten.

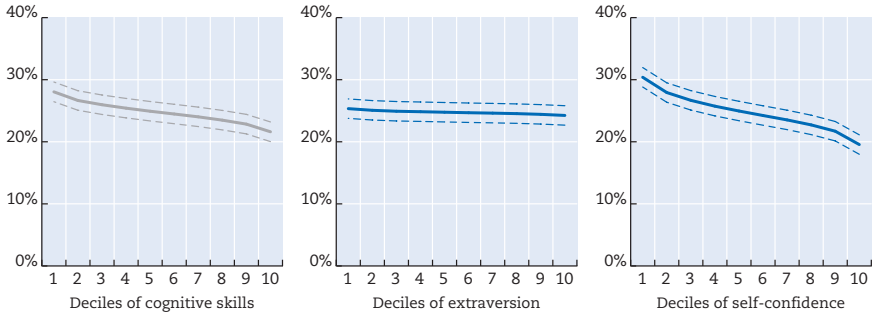
Social and emotional skills can help improve people's lives by improving their behaviours and lifestyles

There are several reasons why social and emotional skills may have a particularly strong impact on a variety of social outcomes. This may happen, for instance, if social and emotional skills enhance economic and social outcomes by shaping people's behaviours and lifestyles, such as drinking, smoking and over-eating, in the case of health outcomes. Such health-related lifestyle factors have an important effect on health outcomes, such as diabetes, obesity and mental disorders (OECD, 2010). Figure 3.10 presents evidence suggesting that social and emotional skills can directly improve some of the key measures of health-related lifestyles.

Figure 3.10. **Social and emotional skills improve health-related lifestyle factors**

Panel A. **Norway**

Probability of being in the highest alcohol disorder quartile at age 26-31, based on self-reports, by skill deciles

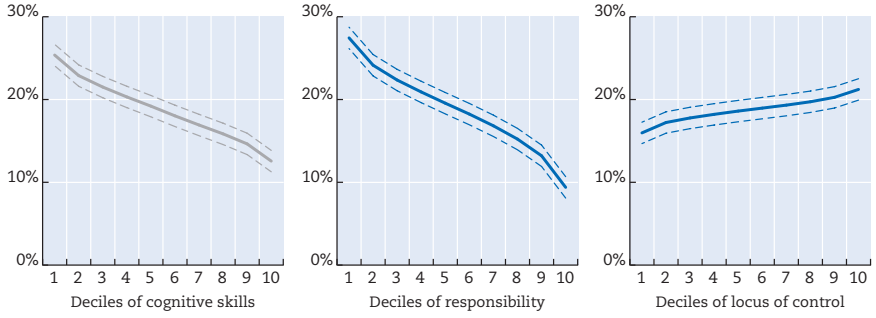


StatLink http://dx.doi.org/10.1787/888933163763

Note: Solid lines depict the probability of being in the highest quartile of the alcohol disorder distribution at age 26-31 based on the Alcohol Use Disorders Identification Test (AUDIT), and dotted lines, 2.5-97.5% confidence intervals. Results are based on the OECD's longitudinal analyses (Box 3.1). Cognitive skills are captured by a latent cognitive skill factor estimated using measures of achievement tests, grades and self-rated academic competence at age 15-19. Social and emotional skills are captured by a latent extraversion factor estimated using measures of shyness, social acceptance and friendliness, and a latent self-confidence factor estimated using measures of self-satisfaction and confidence in oneself at age 15-19.

Panel B. **Korea**

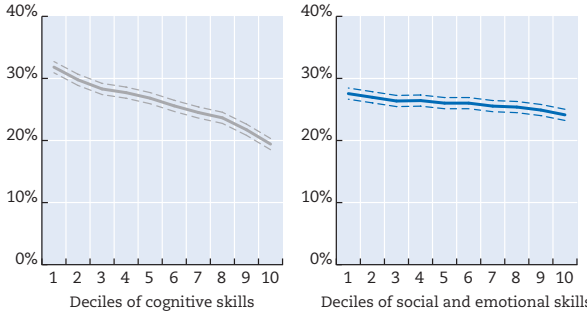
Probability of self-reported smoking at age 19 by skill deciles



Note: Solid lines depict the probability of self-reported experience of smoking at age 19, and dotted lines, 2.5-97.5% confidence intervals. Results are based on the OECD's longitudinal analyses (Box 3.1). Social and emotional skills are captured by a latent responsibility factor estimated using measures of impulsiveness, despondency and apprehensiveness at age 14; and a latent locus of control factor estimated using measures of "confidence in making own decisions", "belief in one's capacity to deal with problems" and "belief in the capacity to take responsibility of one's own life" at age 14. Cognitive skills are captured by a latent cognitive skill factor estimated using measures of achievement test scores and academic grades at age 14, and conditioning on latent responsibility and locus of control factors. The empirical model assumes that measures of achievement test scores and academic grades are a function of latent cognitive and social and emotional skill factors.

Panel C. **United Kingdom**

Probability of smoking every day at age 26, based on self-reports, by skill deciles

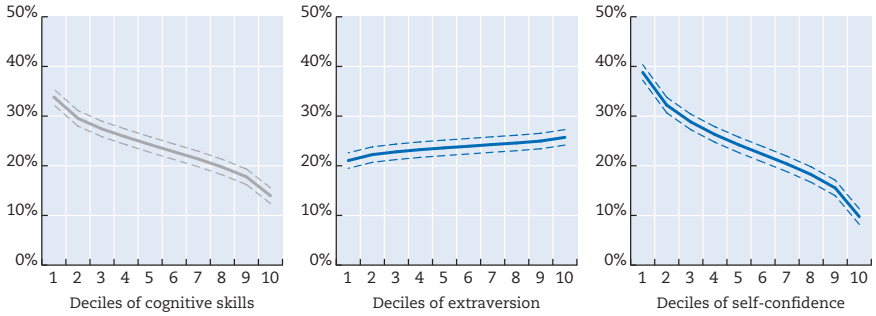


Note: Solid lines depict the probability of smoking every day at age 26 based on self-reports, and dotted lines, 2.5-97.5% confidence intervals. Results are based on the OECD's longitudinal analyses (Box 3.1). Cognitive skills are captured by a latent cognitive skill factor estimated using measures of general cognitive ability at age 10. Social and emotional skills are captured by a latent social and emotional skill factor estimated using measures of self-esteem, locus of control and persistence at age 10.

Figure 3.10. **Social and emotional skills improve health-related lifestyle factors** (continued)

Panel D. **Norway**

Probability of eating disorders at age 26-31, based on self-reports, by skill deciles



Note: Solid lines depict the probability of being in the highest quartile of eating disorder distribution at age 26-31, based on the Eating Attitudes Test (EAT), and dotted lines, 2.5-97.5% confidence intervals. Cognitive skills are captured by a latent cognitive skill factor estimated using measures of achievement tests, grades and self-rated academic competence at age 15-19. Social and emotional skills are captured by a latent extraversion factor estimated using measures of shyness, social acceptance and friendliness, and a latent self-confidence factor estimated using measures of self-satisfaction and confidence in oneself at age 15-19.

In Norway (Panel A), an increase in the level of self-confidence at age 15-19 reduces the likelihood of being in the highest quartile of drinking disorder by 11 percentage points. An increase in the level of cognitive skills also reduces the chances of drinking disorders in Norway but to a lesser extent.

A similar pattern is observed for smoking. In Korea (Panel B), an improvement in the level of responsibility among the 14-year-olds from the lowest to the highest decile reduces the likelihood of daily smoking at age 19 by 18 percentage points, which is much higher than the corresponding impact of raising cognitive skills (13 percentage points). Note, however, the high impact of cognitive skills on reducing daily smoking behaviours in the United Kingdom (Panel C), compared to the impact of social and emotional skills. Cognitive ability may play a much more important role than social and emotional skills in better understanding the health consequences of daily smoking and the complex methods to follow through the process of quitting smoking. Lastly, In Norway (Panel D), an increase in self-confidence among adolescents from the lowest to the highest decile reduces the likelihood of individuals experiencing eating disorders during early adulthood by 29 percentage points, a much higher figure than the corresponding impact of raising cognitive skills (20 percentage points).

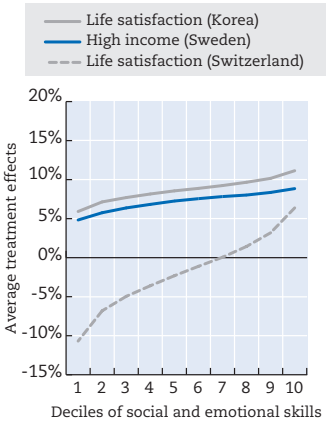
Social and emotional skills can help individuals benefit more from attending tertiary education

Social and emotional skills may also exhibit a particularly strong impact on a variety of social outcomes by helping individuals benefit more from education. Figure 3.11 presents how the impact of going to university on life satisfaction, wages, depression and heavy alcohol consumption vary by levels of social and emotional skills. Panels A and B suggest those with higher levels of social and emotional skills exhibit higher returns from tertiary education, which translates into higher overall returns on investing in social and emotional skills.

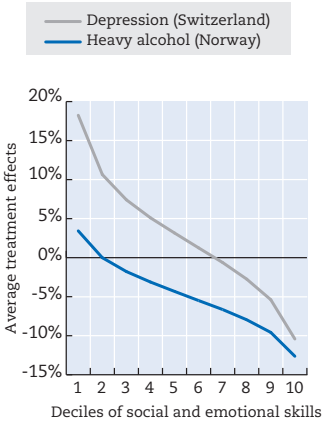
Figure 3.11. **The returns of going to university are higher among those in the higher social and emotional skill deciles**

Average treatment effects (ATE) of going to university by deciles of social and emotional skills

Panel A. **Effects of going to university on life satisfaction and wages**



Panel B. **Effects of going to university on depression and heavy alcohol consumption**



StatLink http://dx.doi.org/10.1787/888933163774

Note: Differences in the average treatment effects between the first and last deciles are statistically different from zero. ATE is calculated based on the impact of college attendance for Korea and Norway, university attendance for Sweden and tertiary education completion for Switzerland. Results are based on the OECD's longitudinal analyses (Box 3.1). Cognitive skills are captured by latent cognitive skill factors estimated using measures of achievement test scores and academic grades as well as latent responsibility and locus of control factors at age 14 (Korea); measures of achievement tests, grades and self-rated academic competence at age 15-19 (Norway); measures of grades, special and verbal ability at Grade 3 (Sweden); and measures of PISA reading, maths and science scores at age 15 (Switzerland). Social and emotional skills are captured by a latent locus of control factor estimated using measures of "confidence in making own decisions", "belief in one's capacity to deal with problems" and "belief in the capacity to take responsibility of one's own life" at age 14 (Korea); a latent self-confidence factor estimated using measures of self-satisfaction and confidence in oneself at age 15-19 (Norway); a latent social and emotional skill factor estimated using measures of grit, social anxiety and social co-operation at Grade 3 (Sweden); and a latent self-esteem factor estimated using measures of self-satisfaction, acknowledgement, and confidence in doing things as well as most other people at age 16 (Switzerland). Life satisfaction is captured by the probability of self-reported life satisfaction at age 19 (Korea) and the probability of having positive attitudes towards life at age 25 based on self-reports (Switzerland). Depression (Switzerland) is captured by the probability of being in the top quartile of a depression scale (constructed using measures of positive and negative affectivity) at age 25. Heavy alcohol (Norway) is captured by the probability of being in the highest quartile of the alcohol disorder distribution at age 26-31. High income (Sweden) is captured by the probability of being in the top income quartile based on self-reporting at age 30.

For instance, in Korea, among those who are at the highest decile of locus of control distribution, the average impact of going to college on life satisfaction is 11 percentage points, while among those who are at the lowest decile of locus of control distribution, the corresponding impact is 6 percentage points. In Switzerland, among those who are at the highest decile of self-esteem distribution, the average impact of going to college on self-reporting depression is -10 percentage points, while among those who are at the lowest decile of self-esteem distribution, the corresponding impact is 18 percentage points.

Social and emotional skills can improve individuals' capacities to translate intentions into actions

Another reason for social and emotional skills to exhibit a strong impact on a variety of social outcomes may be due to the possibility that these skills help "activate" cognitive skills, and in so doing improve individuals' socio-economic outcomes.

By way of illustration, Figure 3.12 presents the likelihood of reporting the symptoms of mild depression among those with high and low self-esteem (the top and bottom quartiles of the distribution, respectively) in Switzerland. Among those with high self-esteem, an increase in cognitive skills is likely to considerably reduce the self-reported incidence of depression (blue line). On the other hand, those with low self-esteem do not appear to benefit as much from an increase in cognitive skills (red line). High cognitive skills may help individuals identify and develop strategies to treat their own depressive symptoms and learn from doctor's medical advice. Their high level of

self-esteem may then allow individuals to translate intentions into concrete actions and engage in treatment programmes.

Figure 3.12. **The impact of cognitive skills on reducing the likelihood of depression is higher among those with higher self-esteem**

Probability of self-reported depression at age 25 in Switzerland, by deciles of cognitive skills for those in the top and bottom quartiles of the self-esteem distribution

StatLink http://dx.doi.org/10.1787/888933163788

Note: Solid lines depict the probability of being in the top quartile of a depression scale at age 25 based on self-reports, and dotted lines, 2.5-97.5% confidence intervals. Results are based on the OECD's longitudinal analyses (see Box 3.1). Cognitive skills are captured by a latent cognitive skill factor estimated using measures of PISA reading, maths and science scores at age 15. Self-esteem is captured by a latent self-esteem factor estimated using measures of self-satisfaction, "acknowledgement of own good qualities" and "confidence in doing things well" at age 16. Depression is captured by self-reported measures and identifying individuals who were at the top quartile of depression scale, constructed using measures of positive and negative affectivity at age 25.

Carneiro, Crawford and Goodman (2007) present similar evidence based on a longitudinal study in the United Kingdom. They suggest that the relationship between cognitive skills and both smoking and truancy at age 16 varies considerably with the level of children's social skills. For individuals with high levels of social skills, the probability that they smoke more than 40 cigarettes per week decreases as cognitive skills increase. However, among those with lower social skills, the probability of smoking increases as cognitive skills increase. In other words, high cognitive skills are associated with a low probability of heavy smoking for those with high social skills, but high cognitive skills among individuals with low social skills are associated with a high probability of heavy smoking. These complex interactions between cognitive, social and emotional skills mean tackling delinquency is not straightforward. Diverse skills should be simultaneously considered when analysing their impact on socio-economic outcomes.

Social and emotional skills generally improve children's life outcomes across the skills distribution

Do social and emotional skills matter only after children accumulate a certain threshold level? The results from the OECD's longitudinal analyses suggest that social and emotional skills with high average returns for socio-economic outcomes generally matter across the skills distribution. There is limited evidence of threshold effects whereby only those who are above a certain skill level benefit from further investments in social and emotional skills. Various figures presented in this chapter suggest that not only are the returns on raising social and emotional skills high on average, but the effects are continuous across the distribution.

Social and emotional skills provide opportunities for disadvantaged children to improve their life prospects

Figures presented in this chapter generally suggest that social and emotional skills also matter for those in the lower tail of the social and emotional skills distribution, which is likely to include

children from disadvantaged backgrounds. Intervention studies, albeit mostly based in the United States, provide evidence on the positive impact investments in skills have on the disadvantaged populations (see also Chapter 4). A literature review commissioned by the OECD (Kautz et al., 2014) suggests that social and emotional skills can raise the long-term life prospects of disadvantaged children and adolescents for a variety of labour market and social outcomes (see Table 3.1 for a summary of results, and Table 4.2 and Kautz et al., 2014 for a description of these interventions).[5] Even though some intervention programmes have shown disappointing results in terms of education and labour market outcomes in the short- and mid-terms, many of them have demonstrated considerable long-term returns in terms of social outcomes, such as crime and health.

Table 3.1. **Successful intervention programmes tend to raise children's capacity to achieve goals, work with others and manage emotions**

Tasks that demand social and emotional skills	Social and emotional skills fostered	Outcomes		
		Education	Labour market	Social
Achieving goals	Conscientiousness	–	• Earnings (Perry, STAR, Career academies, Year-up)	• Crime (Perry) • Family formation (Career academies)
	Openness to new experience	–	• Employment (ABC)	• Health (ABC)
	Self-efficacy	• Educational attainment (Seattle)	• Earnings (Seattle)	• Health (Seattle)
Working with others	Social, communication and team-working skills	• Educational attainment (PTE) • Grades (BAM, MLES)	• Earnings (Perry, STAR, Year-up) • Wages (Dominican) • Employment (Dominican, MLES)	• Crime (Perry, MLES)
	Agreeableness (externalising behaviours)	–	• Earnings (Perry) • Employment (ABC)	• Crime (Perry) • Health (ABC)
Managing emotions	Emotional stability (internalising behaviours), self-esteem, impulse control	• Educational attainment (PTE)	• Earnings (Jamaican, Perry) • Wages (Dominican) • Employment (ABC, Dominican)	• Crime (NFP, Perry) • Health (ABC)

Note: Results presented reflect statistically significant outcomes. ABC (*Abecedarian Project*), Dominican (*Dominican Youth Employment Program*), BAM (*Becoming a Man*), MLES (*Montreal Longitudinal Experimental Study*), NFP (*Nurse-Family Partnership*), Perry (*Perry pre-school program*), PTE (*Pathways to Education*), Seattle (*Seattle Social Development Project*), STAR (*Project Star: Steps to Achieving Resilience*).

Source: Based on Kautz, T. et al. (2014), "Fostering and Measuring Skills: Improving Cognitive and Non-cognitive Skills to Promote Lifetime Success", *OECD Education Working Papers*, No. 110, OECD Publishing, http://dx.doi.org/10.1787/5jxsr7vr78f7-en.

Conscientiousness, sociability and emotional stability are among the key socio-emotional skills that matter across selected countries and cultures

The results from intervention studies (Table 3.1) and a summary of the OECD's review of longitudinal studies (Table 3.2) point to the areas in which social and emotional skills could play a particularly important role. These are achieving goals, working with others and managing emotions. Within these domains, evidence suggests that conscientiousness (to be responsible, perseverant and reliable), sociability and emotional stability can be particularly important drivers of lifetime success. These conclusions are broadly in line with the literature reviews documented by Almlund et al. (2011) and Gutman and Schoon (2013).

Table 3.2. **Social and emotional skills that drive children's lifetime success are those that raise individuals' capacity to achieve goals, work with others and manage emotions**

Tasks that demand social and emotional skills	Social and emotional skills	BEL	CAN	CHE	GBR	KOR	NOR	NZL	SWE	USA
Achieving goals	Responsibility	○				●		○		○
	Persistence, Perseverance	○		●	○			○	○	○
	Locus of control, Self-efficacy		○	●	○	●				
Working with others	Extraversion, Sociability	○					●	○	○	
	Adaptability								○	
Managing emotions	Reactivity, Mood									○
	Self-confidence		○				●			
	Self-esteem	○	○	●	○					○

Note: This table is based on the empirical results from the OECD's longitudinal analyses (Box 3.1). It presents the social and emotional skills with statistically significant improvements of over 5 percentage points, after moving individuals from the lowest to highest skill deciles, in at least one socio-economic outcome. Cells are marked ● when the impact of the corresponding latent social and emotional skill construct on socio-economic outcomes was directly assessed using multiple skill measures. Cells are marked ○ when the impact of the corresponding latent social and emotional skill construct on socio-economic outcomes was indirectly assessed by using a higher-order latent construct of social and emotional skills. This higher-order latent construct was constructed by multiple measures of social and emotional skills, including one measure of the corresponding latent social and emotional skill construct.

Not all social and emotional skills exhibit positive effects

While the previous sections have painted a rather positive picture of the powers of social and emotional skills, it is important to note that not all social and emotional skills exhibit positive effects for all outcomes. Some of the figures presented in this chapter suggest that increasing social and emotional skills could help improve certain outcomes, but exhibit negative effects on others. For example, while persistence among children in Switzerland has a considerable positive effect in improving their attitudes towards life (Figure 3.9, Panel C), it also raises the likelihood of these children misbehaving, such as having problems with the police, and school delinquency (Figure 3.6, Panel C). This highlights the importance of taking a nuanced view of the empirical results. Having more of a particular skill does not necessarily help improve all socio-economic outcomes. This may be because individuals' behaviours and outcomes are driven not only by the particular social and emotional skills that they possess, but also by their capacity to deploy (or "not" deploy) such skills depending on the circumstances that they face. If this capacity is considered to be another type of social and emotional skills, it would be useful to measure this and assess if individuals with a combination of all these social and emotional skills can consistently perform well across diverse life situations.

Conclusion

Evidence from the OECD's longitudinal analyses and the empirical literature suggest that social and emotional skills together with cognitive skills play an important role in driving children's lifetime success. Social and emotional skills are particularly effective in improving social outcomes, while cognitive skills are particularly important drivers of tertiary education and labour market outcomes (Table 3.3). Moreover, cognitive and socio-emotional skills interact, cross-fertilise and further empower children so that they can achieve positive outcomes.

Table 3.3. **Cognitive, social and emotional skills contribute to children's lifetime success**

	Returns on skills		
	Education	**Labour market**	**Social**
Cognitive skills	High	High	Medium
Social and emotional skills	Low – Medium	Medium	High

Note: This table is generated based on results presented in this chapter, including Figures 3.1-3.10, as well as Tables 3.1 and 3.2.

It is important to reiterate the differences in skills, outcomes and control measures used and the ages at which they were measured across different longitudinal datasets used in this study. In spite of these differences, the results suggest remarkably consistent findings across countries. Nevertheless, the impact of cognitive, social and emotional skills on outcomes can vary considerably across countries. For instance, the results presented show that an increase in the level of children's cognitive skills, on one hand, helps reduce conduct problems during adolescence in the United Kingdom, while on the other hand, increases conduct problems in Switzerland. Some skills may be particularly effective in one culture but not in another.

The strengths of social and emotional skills are likely to come, in part, from their capacity to shape people's behaviour and lifestyles, to benefit more from attending tertiary education and to better leverage their cognitive capabilities. Social and emotional skills generally benefit individuals across the distribution of skills, and interventions to raise these types of skills can be particularly beneficial for disadvantaged populations. This may have an important bearing on strategies to reduce socio-economic inequalities. Among the diverse social and emotional skills that have been measured and tested, conscientiousness, sociability and emotional stability are among the most important dimensions that drive children's future labour market and social prospects.

Cognitive skill measures used in the OECD's longitudinal analyses are likely to capture skills typically used as yardsticks for educational success by students, schools or the school system (e.g. achievement tests, grades and literacy tests). Our evidence presented here suggests that they should remain as key measures, as they are particularly important for children's education and labour market outcomes. Nevertheless, there are other important dimensions of skills that may deserve more attention. The analyses presented in this chapter show that even a single dimension of social and emotional skills can predict diverse measures of children's future positive outcomes. Unlike academic grades and achievement tests, these skills are not always regularly measured and reported to teachers and parents in order to improve pedagogy and learning. While not all social and emotional skills improve outcomes, policy makers interested in better enhancing diverse measures of individual well-being and social progress may consider tapping into this area of skill development.

Notes

1. Given our interest in identifying the causal effects of skills, the evidence described in this chapter is primarily limited to those that generate counterfactuals, either via simulations (as in the Norwegian example) or by identifying appropriate control and treatment groups (as in the case of intervention programmes).

2. In order to better understand the scale of the impact of social and emotional skills on socio-economic outcomes, its effect was empirically isolated from those of cognitive skills. The aim is not necessarily to contrast the two skill constructs. They actually interact in meaningful ways (Chapters 2 and 4). As in the case of any empirical analyses, the estimate of the returns due to skills depends on the measurements used. Some of the returns may be either statistically insignificant or small due to the noisy measures used. Many of the longitudinal studies do not offer estimation of a range of important social and emotional factors that can be hypothesised to affect outcomes. Nevertheless, an important finding from these studies is that the effect of even one dimension of social and emotional skills (e.g. self-confidence) shows considerable impact on measures of children's socio-economic outcomes. If a range of measures of key social and emotional skills was available, the explanatory power of these combined measures could have a significant impact.

3. Locus of control is one dimension of core self-evaluations that refers to how much a person believes his or her actions affect his/her future (Rotter, 1966). That is, people who have higher levels of locus of control tend to believe their actions can shape their future more than luck would. Abramson, Seligman and Teasdale (1978) associate locus of control with positivism and relate it with the way people deal with negative events. Positive people attribute negative events to short-term and specific reasons that they believe are in their power to remediate or overcome (Tough, 2012). Positive people have more locus of control than negative people who attribute bad events to long-term reasons they believe are out of their control (Seligman, 1991).

4. Control variables used are: Belgium (Flemish Community): gender, parental education, household income, nationality, existence of younger or older siblings, birth year and months, living in nuclear family; Canada: gender, parental education, family income, wealth, number of siblings, residential region, visible minority, immigrant status; New Zealand: gender, parental education; Norway: age, gender, parental education, parental occupation, number of siblings, lives with parents; Korea: age, gender, parental education, parental income, number of siblings, lives with parents, urban residence; Sweden: age, gender, parental education, lives with parents, type of dwelling; Switzerland: gender, parental education, lives with parents, lives in German region, urban residence; the United Kingdom: age, gender, income; and the United States: gender, race, parental education, mother's employment, socio-economic status (poverty, reduced lunch), disability, number of parents, biological parents, religion.

5. Returns to education, labour market and social outcomes may be due to other features of the interventions which in general have multiple objectives, e.g. reducing family poverty, improving family health, raising children's IQs. Moreover, some of the intervention programmes described in Table 3.1 have not necessarily tested the social and emotional skills that the programme was designed to raise, since the ultimate benchmark of success was other indicators, such as poverty reduction. It was assumed that the intervention programmes increased the social and emotional skills in question and that this in turn had some impact on outcomes for the programme participants.

References

Abramson, L.Y., M.E.P. Seligman and J.D. Teasdale (1978), "Learned helplessness in humans: Critique and reformulation", *Journal of Abnormal Psychology,* Vol. 87, No. 1, pp. 49-74.

Almlund, M. et al. (2011), "Personality psychology and economics", *Handbook of the Economics of Education,* Vol. 4, pp. 1-181.

Carneiro, P., C. Crawford and A. Goodman (2007), *The Impact of Early Cognitive and Non-Cognitive Skills on Later Outcomes,* Centre for the Economics of Education, London School of Economics, London.

Cunha, F. and J.J. Heckman (2008), "Formulating, identifying and estimating the technology of cognitive and noncognitive skill formation", *Journal of Human Resources,* Vol. 43, No. 4, pp. 738-782.

Cunha, F., J.J. Heckman and S. Schennach (2012), "Estimating the technology of cognitive and noncognitive skill formation", *Econometrica,* Vol. 78 (3), pp. 883-931.

Gutman, L.M. and I. Schoon (2013), *The Impact of Non-Cognitive Skills on Outcomes for Young People. Literature Review,* Institute of Education, University of London, London.

Heckman, J.J., J.E. Humphries and G. Veramendi (2014), "Education, health and wages", *NBER Working Paper,* No. 19971.

Heckman, J.J. and T. Kautz (2012), "Hard evidence on soft skills", *Labour Economics,* Vol. 19 (4), pp. 451-464.

Heckman, J.J., J Stixrud and S. Urzua (2006), "The effects of cognitive and noncognitive abilities on labor market outcomes and social behavior", *Journal of Labor Economics,* Vol. 24 (3), pp. 411-482.

Kautz, T. et al. (2014), "Fostering and Measuring Skills: Improving Cognitive and Non-cognitive Skills to Promote Lifetime Success", *OECD Education Working Papers*, No. 110, OECD Publishing, http://dx.doi.org/10.1787/5jxsr7vr78f7-en.

OECD (2010), *Obesity and the Economics of Intervention: Fit Not Fat,* OECD Publishing, Paris, http://dx.doi.org/10.1787/9789264084865-en.

Rotter, J.B. (1966), "Generalized expectancies for internal versus external control of reinforcement", *Psychological Monographs: General & Applied,* 80(1) 1966, pp. 1-28.

Sarzosa, M. and S. Urzua (2014), "Implementing factor models for unobserved heterogeneity in stata: The heterofactor command", mimeo, University of Maryland, pp. 1–26.

Sarzosa, M. and S. Urzua (2013), "Bullying and cyberbullying in teenagers: The role of cognitive and non-cognitive skills", mimeo, University of Maryland.

Sarzosa, M. and S. Urzua (2013), "Bullying and cyberbullying in teenagers: The role of cognitive and non-cognitive skills", mimeo, University of Maryland.

Seligman, M. (1991), *Learned Optimism: How to Change Your Mind and Your Life,* Alfred A. Knopf, New York, NY.

Tough, P. (2012), *How Children Succeed: Grit, Curiosity, and the Hidden Power of Character,* Houghton Mifflin Harcourt, New York, NY.

Urzua, S. and G. Veramendi (2012), "Empirical strategies to identify the determinants and consequences of skills", mimeo, University of Maryland.