Take me on Your Shoulders!
The Effect of Child Mentoring on Education Outcomes

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InstEAD - Workshop

The role of "soft skills" in life outcomes of children and young people

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Motivation

Inequality of opportunity is a major concern in the presence of

1. High and increasing returns to education ▸ graph

2. Educational achievement being determined by SES ▸ graph

- Risk factors are
  - ▸ **Low parental education** (Heineck and Riphahn, 2007; Lundborg et al., 2014)
  - ▸ **Low income** (Duncan et al., 1998; Dahl and Lochner, 2012)
  - ▸ **Single parenthood** (Krein and Beller, 1988; Ermisch and Francesconi, 2001)

Motivation

Much recent work focuses on how opportunities of children from low SES backgrounds can be improved

- **Preschool education** (Deming, 2009; Heckman et al., 2010; Campbell et al., 2014)

- **Intervention programs** focused on parental investments (Gertler et al., 2014; Attanasio et al., 2015)

- **Mentoring**: advising, helping parents, personal assistance (Lavecchia et al., 2014; Oreopoulos, 2014)

Improved equity and potential for large societal returns

Motivation

- Preschool education/ECIPs affect the formation of human capital
- **Mentoring** provides
  - Information/advice (Nguyen, 2008)
  - Role models (Nguyen, 2008; Grossman and Tierney, 1998; Grossman et al., 2012)
  - Character traits (Kosse et al., 2016)
  - Help for overcoming self-control problems (Castleman and Page, 2015)
  - **Substitutes for parental time and encouragement**

$\Rightarrow$ Improve outcomes during critical decision periods (childhood & adolescence)
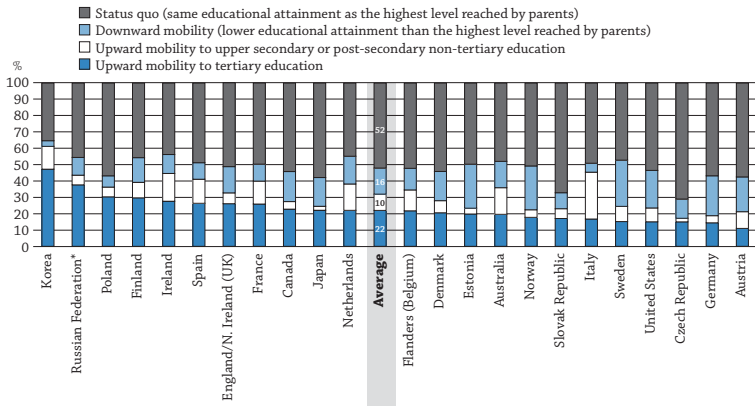
This paper: evidence from a mentoring RCT

Does a low-cost weekly mentoring program during elementary school affect secondary **school track choice** in Germany?

1. What is the **overall effect** of mentoring shortly before a critical education decision (tracking)?

2. Which **groups** benefit most?
   - Household risk factors (poverty, low education, single parenthood)
   - Child characteristics (age, sex, ability)

3. A (short-term) boost at the right time?

The German setting

In Germany educational mobility is low despite 100% free education

Legend:
- Status quo (same educational attainment as the highest level reached by parents)
- Downward mobility (lower educational attainment than the highest level reached by parents)
- Upward mobility to upper secondary or post-secondary non-tertiary education
- Upward mobility to tertiary education

Countries (left to right): Korea, Russian Federation*, Poland, Finland, Ireland, Spain, England/N. Ireland (UK), France, Canada, Japan, Netherlands, Average, Flanders (Belgium), Denmark, Estonia, Australia, Norway, Slovak Republic, Italy, Sweden, United States, Czech Republic, Germany, Austria

OECD (2015), Education at a Glance 2015: OECD Indicators, OECD Publishing, Paris.

The German setting

Early tracking as one reason for low mobility (Bauer and Riphahn, 2005; Pekkarinen et al., 2009)

- After 4th grade:
    - high track: upper secondary school degree (Gymnasium, 42%)
    - middle track: secondary school degree (Realschule, 21%)
    - low track: lower secondary school degree (Hauptschule, 4.3%)
- High track allows for university studies (upper secondary school certificate)
- Teacher recommendation after first half of 4th grade (mandatory or non-mandatory)
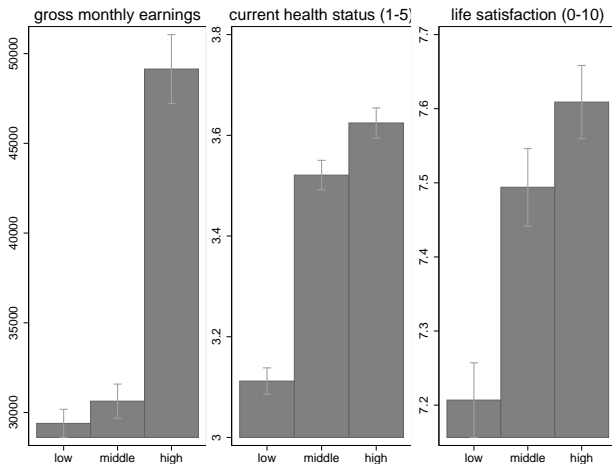
The German setting

Graduation from a certain track is predictive of wages
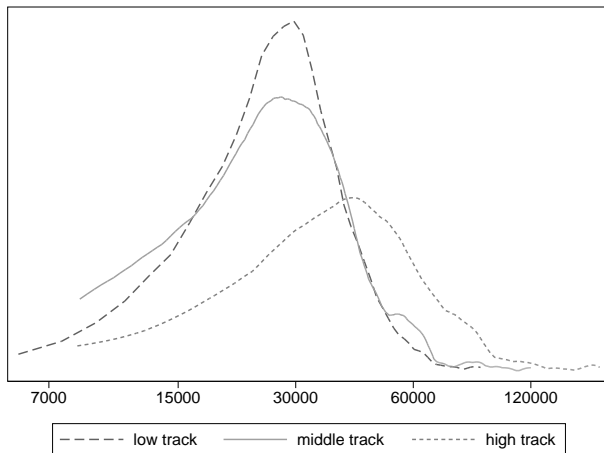
SOEP, 2015, kernel density plot of gross annual wages (ft employed), logarithmic scale, own calculations.
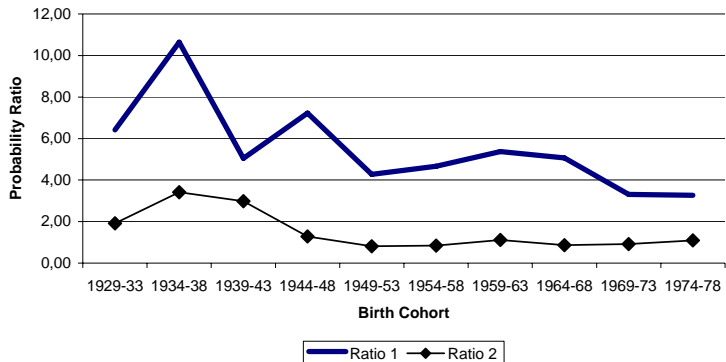
The German setting

Graduation from a certain track is predictive of other life outcomes

SOEP, 2015, own calculations.

The German setting

Graduation from a certain track is predictive of child track choice

Ratio 1: P (child high — parent high) / P (child high — parent low)

Ratio 2: P (child middle — parent middle) / P (child middle — parent low)

Heineck, G. and Riphahn, R.T. (2009), Intergenerational transmission of educational attainment in Germany - The last five decades. *Jahrbücher für Nationalökonomie und Statistik*, pp.36-60 (graph for males only).

The German setting

Parental background matters even after conditioning on IQ/GPA

high track	1	2	3	4	5
parental background					
poor HH	-0.198***	-0.198***	-0.197***	-0.132**	-0.132**
low educated HH	-0.295***	-0.295***	-0.293***	-0.236***	-0.215***
single parent HH	-0.103*	-0.103*	-0.102*	-0.123**	-0.071
gender and age					
sex (male=1)		-0.012	-0.014	-0.024	-0.041
grade			-0.007	-0.078	0.041
ability					
IQ				0.183***	0.100***
GPA					-0.220***
Observations	342	342	341	341	341
pseudo-R2	0.10	0.10	0.10	0.14	0.22

This table reports average marginal effects from a logit model. "Poor" indicates that a respective household earns less than the 30th quantile of the German income distribution. "1 parent" ("2 parents") indicates that a child grows up in a single parent (two parent) household. "Low edu" indicates that a child grows up in a household where neither parent has obtained an upper secondary school certificate (highest track credential). Robust standard errors in parentheses. Treated individuals were excluded from the sample. All models contain a constant (intercept). * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

The mentoring RCT

- Intervention is a mentoring program (Baloo and you)
- Mentors
  - Volunteers, mainly university students
  - Meet children once per week, overall duration: one year
- Concept of the mentoring program:
  - One-to-one mentoring, Informal learning, no focus on achievement
  - Widening a child's horizon through engaging in joint activities with a new contact/attachment person, role model
- Children were in 2nd (80%) or 3rd grade (20%)
- Professional structure: online diaries, paid coordinators, bi-weekly monitoring meetings
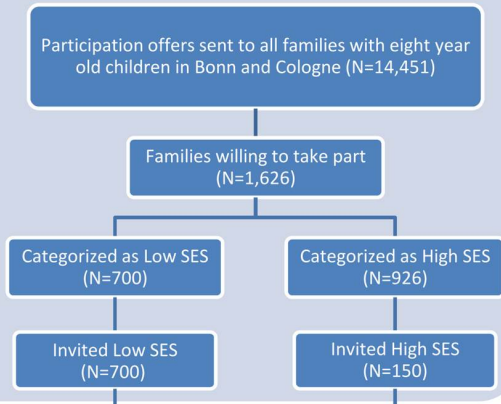- Low monetary costs: 1000EUR per child and year
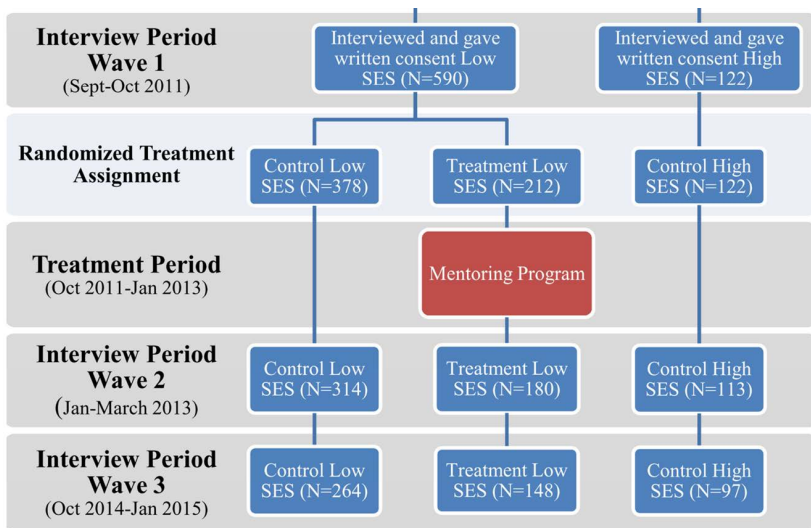
The mentoring RCT

Data collection

- Family addresses from registry data
- Offers to families with
  - Children born between 09/2002 and 08/2004
  - Low income families ($<$30th percentile)
  - Low education families (neither mother nor father with upper secondary school degree)
  - Single parent families
- Stratified random treatment assignment: 14 subgroups by city and SES criteria

Sampling

Recruitment Period
(May-August 2011)

Participation offers sent to all families with eight year old children in Bonn and Cologne (N=14,451)

Families willing to take part (N=1,626)

Categorized as Low SES (N=700)

Categorized as High SES (N=926)

Invited Low SES (N=700)

Invited High SES (N=150)

Sampling

The mentoring RCT

Data come from 3 waves of interviews

- Wave 1+2: Interviews in central location labs, duration: 1 hour
- Wave 3: Interviewer visited families in their homes (SOEP-IS)
  - Mothers: answered a SOEP-like questionnaire
  - Children: one-to-one questionnaires with trained interviewers
- Vast battery of questions on
  - Child characteristics
  - Parental background
  - School outcomes (track, grades, IQ)

The mentoring RCT

Descriptives

Variables	Mean and (sd)						P-val
	high SES control		Low SES control		Low SES treatment		
age of child in months	92.95	(5.95)	93.72	(6.23)	93.52	(6.62)	0.76
school grade in W1	3.28	(0.45)	3.28	(0.47)	3.28	(0.50)	0.91
math grade in W1	1.76	(0.73)	1.90	(0.92)	1.80	(0.79)	0.31
German grade in W1	1.78	(0.66)	2.00	(0.90)	2.06	(0.94)	0.58
IQ(w1)	0.34	(0.95)	0.00	(1.00)	-0.03	(0.95)	0.79
sex (male=1)	0.47	(0.50)	0.52	(0.50)	0.55	(0.50)	0.53
single parent HH	0.00	(0.00)	0.45	(0.50)	0.46	(0.50)	0.82
poor HH	0.00	(0.00)	0.48	(0.50)	0.42	(0.50)	0.22
low educated HH	0.00	(0.00)	0.48	(0.50)	0.50	(0.50)	0.71
N	96		260		145		

The table displays means an standard deviations for the different treatment groups. The last column presents p-values from a ttest of differences in means between the low SES treatment and control groups.

Data and estimation

Treatment and outcome variable definitions

- We define our main **outcome variable** as: "High track in grade 5"
    - Upper secondary school (highest track)
    - Mixed track + good grades (leads to high track degree)

- The **treatment** is whether an individual has been *offered* to take part in the mentoring program (ITT).

Data and estimation
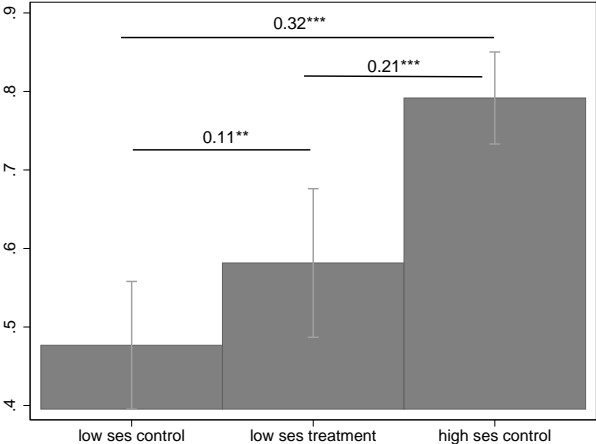
Estimate following equation (linear or nonlinear):

$$y_i = \alpha + \gamma z_i + X_i'\beta + \sum_s d_{is}\delta_s + \epsilon_i, \tag{1}$$

- z: treatment dummy (ITT), compliance 75%
- X_i: vector of individual characteristics
- d_{is}: strata dummies

Control for strata in analyses and when computing standard errors
(Bruhn and McKenzie, 2009)

Results

Treatment effect on attending upper secondary school in grade 5

Results

Overall treatment effect

High track	1	2	3	4
treatment				
treatment assigned=1	0.116**	0.117**	0.116**	0.121**
	(0.05)	(0.05)	(0.05)	(0.05)
gender and timing				
male		-0.016	-0.014	-0.019
		(0.05)	(0.05)	(0.05)
time until decision			0.003	0.010*
			(0.00)	(0.01)
ability				
IQ				0.134***
				(0.03)
Observations	399	399	399	399
F-stat	0.32	0.22	0.35	0.45

Notes: This table reports average marginal effects from a logit model. The high SES control group was excluded from the sample. All models contain a constant (intercept). * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Results

Overall treatment effect on child school track in grade 5
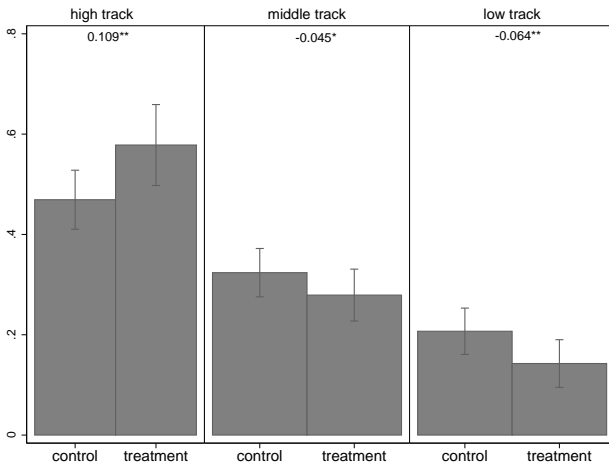
Results

Overall treatment effect

Track choice	1	2	3	4
low track				
treatment assigned	-0.064**	-0.066**	-0.066**	-0.070***
	(0.03)	(0.03)	(0.03)	(0.03)
middle track				
treatment assigned	-0.045*	-0.046*	-0.045*	-0.046*
	(0.03)	(0.03)	(0.03)	(0.03)
high track				
treatment assigned	0.109**	0.111**	0.111**	0.116**
	(0.05)	(0.05)	(0.05)	(0.05)
Observations	405	405	405	405
gender		X	X	X
time until decision			X	X
child IQ				X
F-stat	3.03	2.85	2.69	3.40

Notes: This table reports average marginal effects from an ordered logit model. The high SES control group was excluded from the sample. All models contain a constant (intercept). * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Results

IV estimates

Upper secondary school	1	2	3	4
treated	0.158**	0.158**	0.157**	0.168**
	(0.07)	(0.07)	(0.07)	(0.07)
gender and timing				
sex (male=1)		-0.009	-0.006	-0.016
		(0.05)	(0.05)	(0.05)
time until decision			0.003	0.010*
			(0.00)	(0.00)
ability				
IQ				0.134***
				(0.03)
Observations	405	405	405	405

Notes: This table reports average marginal effects from a two stage least squares instrumental variable model using the assignment to the treatment as an instrument and compliance as a treatment variable. The high SES control group was excluded from the sample. All models contain a constant (intercept). The F-statistic on the excluded instrument in the first stage equals 377. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.
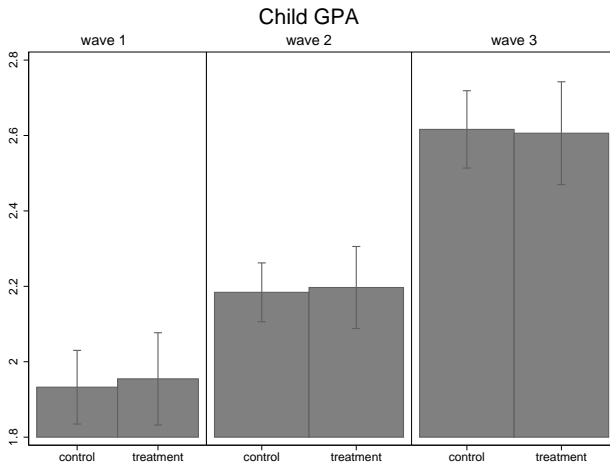
A boost at the right time?

- The mentoring program might affect student characteristics

- Even if there is just a short-term effect it might come at the right time

- Children may become...

  - **Smarter**: IQ (Wechsler IQ+PPVT)
  - **Better in school**: Grades (math/German/foreign language)
  - **More open-minded**: Openness to experience
  - **Beliefs about returns to effort**: Locus of Control
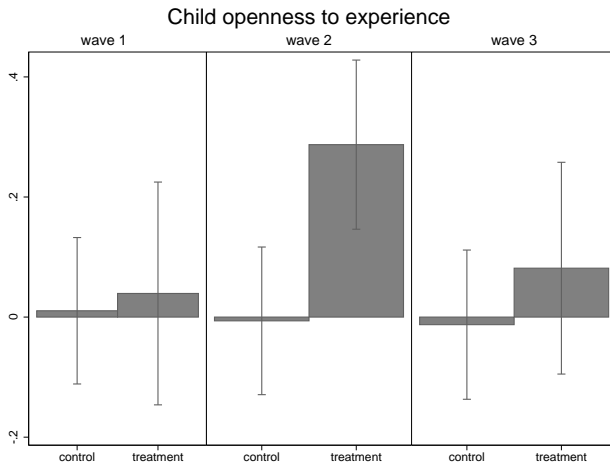 - **More trusting**: Trust (experimentally validated trust questionnaire)
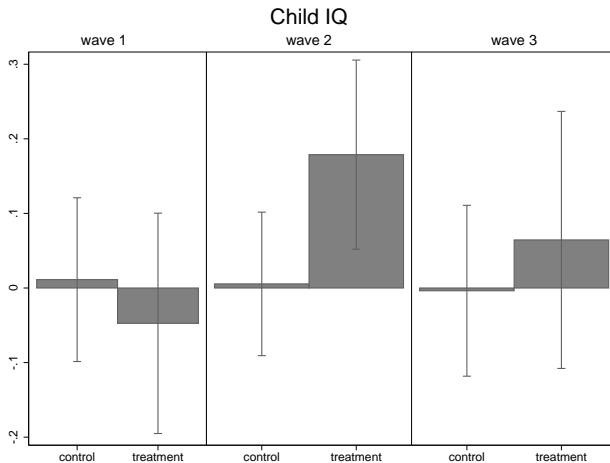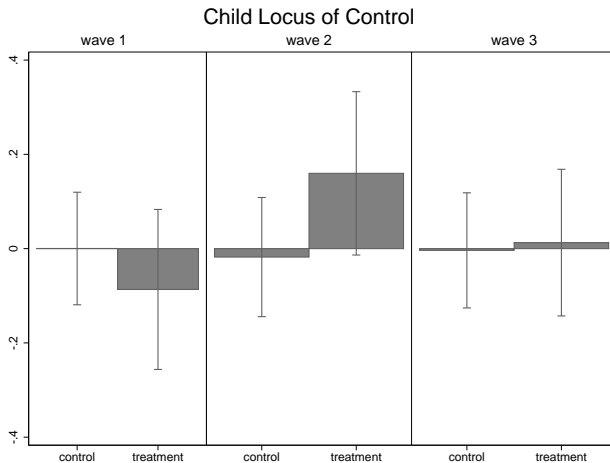
A boost at the right time?
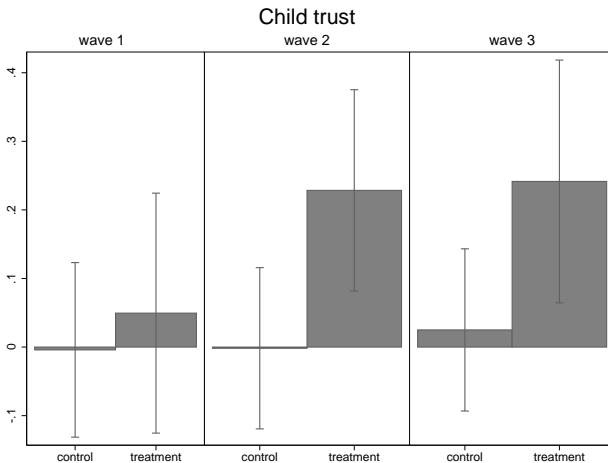
A boost at the right time?

Child GPA

A boost at the right time?

Child openness to experience

A boost at the right time?

Child Locus of Control

A boost at the right time?

Child trust

A boost at the right time?

Child traits (W2)	IQ	GPA	Openness	Locus	Trust
treatment assigned=1	0.174**	0.010	0.291***	0.180	0.229**
	(0.08)	(0.07)	(0.10)	(0.11)	(0.10)
gender and timing					
male	0.034	-0.062	0.148	0.020	-0.006
	(0.08)	(0.06)	(0.09)	(0.10)	(0.09)
time until decision	-0.023***	0.000	-0.014*	-0.007	0.010
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
initial					
IQ(w1)	0.492***	-0.093***	-0.089*	0.055	0.028
	(0.04)	(0.03)	(0.05)	(0.05)	(0.05)
GPA (W1)		0.554***			
		(0.05)			
Openness (W1)			0.103**		
			(0.05)		
Locus (W1)				0.193***	
				(0.06)	
Trust (W1)					0.348***
					(0.05)
Observations	405	371	405	404	405
F-stat	14.69	271.79	2.57	1.64	3.93

Notes: The high SES control group was excluded from the sample. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

A boost at the right time?

IQ	wave 1	wave 2		wave 3	
treatment assigned=1	-0.059	0.174**	0.173**	0.068	0.068
	(0.09)	(0.08)	(0.08)	(0.10)	(0.11)
initial IQ					
IQ(w1)		0.492***	0.502***	0.321***	0.318***
		(0.04)	(0.05)	(0.06)	(0.07)
Treatment*IQ(w1)			-0.028		0.011
			(0.09)		(0.11)
gender and timing					
male	0.077	0.034	0.035	-0.062	-0.062
	(0.09)	(0.08)	(0.08)	(0.10)	(0.10)
time until decision	-0.046***	-0.023***	-0.023***	-0.014	-0.014
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Observations	405	405	405	400	400
F-stat	5.72	15.37	14.73	5.26	4.98

Notes: The high SES control group was excluded from the sample. All models contain a constant (intercept). * p < 0.1, ** p < 0.05, *** p < 0.01.

A boost at the right time?

openness	wave 1	wave 2		wave 3	
treatment assigned=1	-0.035	0.296***	0.293***	0.092	0.077
	(0.12)	(0.10)	(0.10)	(0.11)	(0.11)
initial					
Openness (W1)		0.104**	0.080	-0.051	-0.115*
		(0.05)	(0.07)	(0.05)	(0.07)
Treatment*openness(W1)			0.057		0.160
			(0.09)		(0.11)
gender and timing					
male	0.019	0.141	0.145	-0.326***	-0.314***
	(0.10)	(0.09)	(0.09)	(0.10)	(0.10)
time until decision	0.017*	-0.010	-0.010	0.013	0.014
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Observations	405	405	405	385	385
F-stat	1.15	1.83	1.80	1.54	1.56

Notes: The high SES control group was excluded from the sample. All models contain a constant (intercept). * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

A boost at the right time?

As we include potential channels the treatment effect becomes smaller and insignificant

Upper secondary school	1	2	3	4	5
treatment					
treatment assigned=1	0.121**	0.092*	0.081	0.082*	0.078
gender and timing					
male	-0.046	-0.064	-0.067	-0.068	-0.068
time until decision	0.002	0.002	0.002	0.002	0.003
child traits					
IQ (W2)		0.067**	0.061**	0.061*	0.035
GPA (W2)		-0.262***	-0.247***	-0.247***	-0.201***
Openness (W2)			0.009	0.014	0.017
Locus (W2)			0.044**	0.046**	0.056***
Trust (W2)				-0.018	-0.015
Parental prob (W2)					0.171***
Observations	365	352	352	352	340
R2	0.19	0.21	0.32	0.32	0.34

Notes: The high SES control group was excluded from the sample. All models contain a constant (intercept). * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Conclusion

We show that a low-cost low-intensity mentoring program

- **Improves education outcomes** of low SES children
  - ▶ Program has to come "at the right time"
  - ▶ Large effects for high poverty households
  - ▶ Large effects for highly educated low SES households
- Mentoring seems effective for
  - ▶ Families that are **constrained** in money and time
  - ▶ Kids that are **at the margin**
- Our results suggest a boost in a **IQ and locus of control/openness** as potential channels

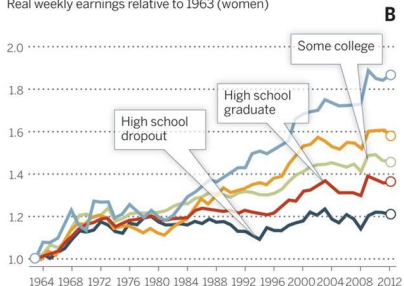# THANK YOU

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Returns to education

Returns to education are increasing

Changes in real wage levels of full-time U.S. workers by sex and education, 1963–2012

Real weekly earnings relative to 1963 (men)   **A**

Real weekly earnings relative to 1963 (women)   **B**

Labels (men): > Bachelor's degree; Bachelor's degree

Labels (women): Some college; High school graduate; High school dropout

Autor, D. H. (2014). Skills, education, and the rise of earnings inequality among the "other 99 percent". *Science*, 344(6186), 843-851.
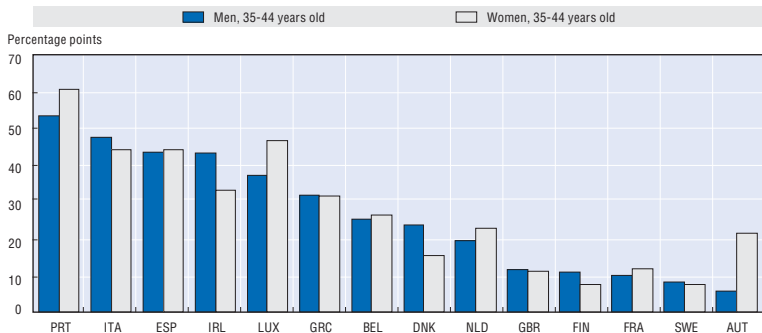
School performance by SES

Low SES children perform worse in PISA
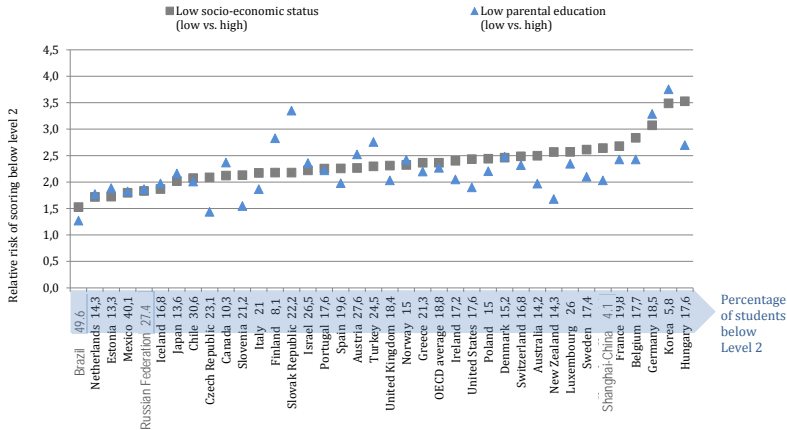
Source: OECD (2010a), PISA 2009 Results: Volume II, Overcoming Social Background: Equity in Learning Opportunities and Outcomes, OECD, Paris.

High persistence

Persistence in below upper secondary education ▸ back

1. Persistence in below upper secondary education is measured as the distance between the estimated probability to achieve below upper secondary education of an individual whose father also had below upper secondary education and the probability to achieve below upper secondary education of an individual whose father had achieved tertiary education. A larger number implies a larger gap, thus stronger persistence in below upper secondary education or a lower degree of mobility across generations. For details see Causa *et al.* (2009).

Source: OECD calculations based on the 2005 EU-SILC Database, OECD, Paris.