Socio-Emotional Skills and the Transmission of Economic Advantage

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19th Winter School on Inequality and Social Welfare Theory
Alba di Canazei – January 7 2026

Our aims today

Learning goals

- Define what Socio-Emotional Skills (SEmSkills) are
- Reflect on key measurement issues (informant-bias or contamination)
- Consider the role of different constructs
- Present evidence on SES gradient in SEmSkills and their intergenerational persistence
- Compare results across different studies

Motivation: why SEmSkills may transmit SES advantage

- SEmSkills can contribute to intergenerational transmission of advantage because they are:
  1. **Socially patterned** (SES gradients appear early)
  2. **Persistent and transmitted across generations** (parent $\rightarrow$ child)
  3. **Predictive/potentially causal** for education and labour-market outcomes
- Core question: How much of adult SES differences/IGE do SEmSkills explain?

Main discussion points

- To understand how SEmSkills contribute to the transmission of advantage we need to discuss issues of:
  1. **Measurement**
     - Single vs. multiple informants, issues of contamination
     - Latent approach vs. pre-determined scales
     - Measurement error adjustment

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     - Aggregated constructs (internalizing/externalizing) vs. disaggregated (attention, conduct, etc.)
     - Age at which skills are measured

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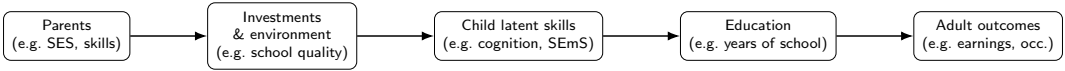
  3. **Outcomes/Mediators**
     - Earnings, education (mediator?), occupation, health, etc.
- Before we do this, we need to clarify our *conceptual framework* and our *definition* of SEmS

Conceptual framework



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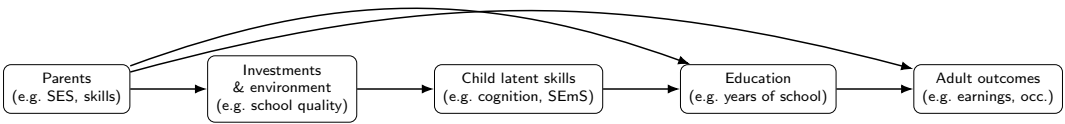

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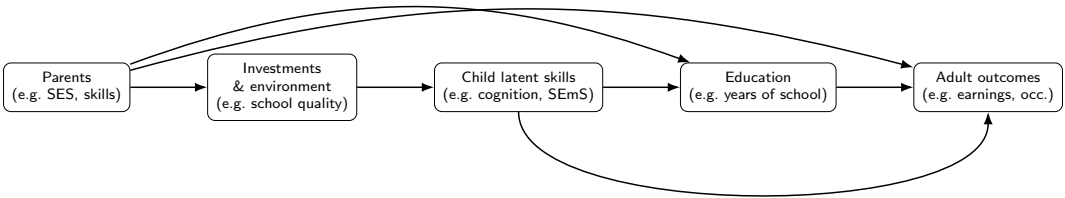

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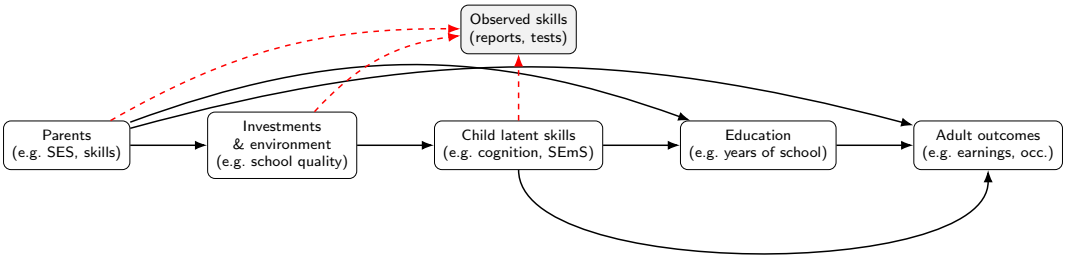

Definition

What are Socio-Emotional Skills?

Definition: A useful taxonomy (Goodman et al., 2015)

- **Self-perception/self-awareness**
  - Self-esteem, self-efficacy, academic self-concept, locus of control
- **Motivation and beliefs**
  - Aspirations/expectations, growth mindset, goal orientation, perceived returns to effort
- **Self-control/self-regulation**
  - Attention, persistence/grit, impulse control, time preference/self-discipline, emotion regulation
- **Social skills**
  - Cooperation, communication, empathy, teamwork/leadership, prosocial behaviour

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- Other examples, see Algan & Huillery; Borghans et al.; Almlund et al.; Heckman & Kautz

Definition: A measurement-based distinction (DEG 2025)

- **Personality traits (Big Five/OCEAN)** (see Borghans et al. 2008)
  - Value-neutral framework (i.e. neither good nor bad)
  - Usually collected in adulthood, from individuals themselves
- **Behavioural screening scales** (see DEG 2025)
  - Strengths and Difficulties Questionnaire (SDQ): **hyperactivity/inattention, conduct, emotional symptoms, peer problems**
  - Multiple ages and informants, sensitive to reporting/context
  - Often interpreted as "skills", but note that they represent **difficulties**
- **Nordic armed-forces/administrative assessments** (see Edin et al. 2022, AEJ Applied)
  - Interview-based composites (e.g. emotional stability, social maturity/energy)
  - Often male-only, late-teen measurement
- **Behaviour proxies** (see Deming 2017)
  - Sociability/leadership; extracurricular participation (e.g. sport)
  - Bundles preferences with opportunities/constraints (SES confounding)

Definition: Not a one-to-one mapping across measures

SDQ/Child Behav. Problems	Big Five Traits	Swedish Military Assessment	Finnish Military Assessment
Attention	↓ Conscientiousness	Negative	↓*Deliberation** ↓ Achievement Striving
Conduct	↓ *Agreeableness** ↑ *Neuroticism** ↑ Extraversion	Positive (through ↓ *Agreeableness** ↑ Extraversion)	↑ Sociability ↓ Dutifulness
Emotional	↑ *Neuroticism** (strong) ↓ Extraversion	Negative	↓ Self-confidence ↓ *Deliberation**
Peer	↓ Extraversion ↑ *Neuroticism** ↓ *Agreeableness**	Negative	↓ Sociability ↓ Leadership Motivation

Measurement

Why measurement issues are particularly relevant when working on SEmSkills

Measurement: Why we should worry

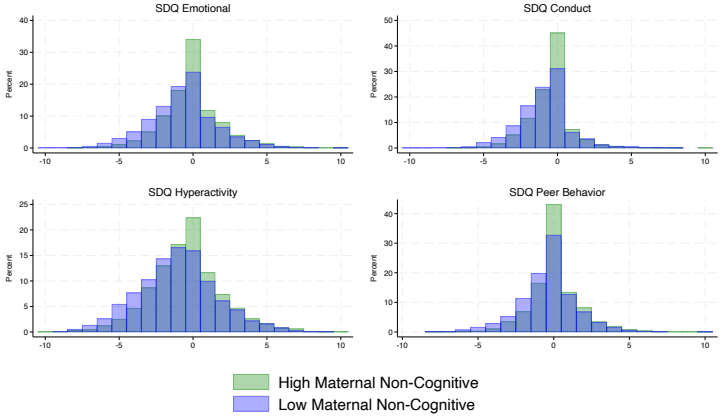
- **Multi-informant reports**: parent/teacher/self can disagree; each may capture different contexts and biases (e.g. contamination bias)
- **Latent-factor models**: map item batteries into dimensions; can reduce noise and clarify constructs
- **Measurement error** attenuates effects and can change results, often significantly

The **measurement** of socio-emotional skills: contamination bias

- *Skills formation and the trouble with child non-cognitive skills measures*
  with Josh Kinsler and Ronni Pavan (DKP 2024)

- Socio-emotional skills often measured using "subjective" survey questions, usually answered by parents or teachers
- These answers may be contaminated by the attributes of the observer
  - e.g.: a parent with mental health issues views her child's behavior as more problematic
- Observer's attributes are also inputs in the production function of skills

Differences between parent and teacher-reported measures



- Mothers with lower non-cognitive skills (mental health) evaluate children more negatively

Subjective Measurements - Parents

- Parent-reported child non-cognitive skills:

$$M^N_{Pjt} = \alpha^N_{P,1jt} N_t + \alpha^N_{P,2jt} \boldsymbol{C^P} + \alpha^N_{P,3jt} \boldsymbol{N^P_t} + \alpha^N_{P,4jt} \theta + \epsilon^N_{Pjt},$$

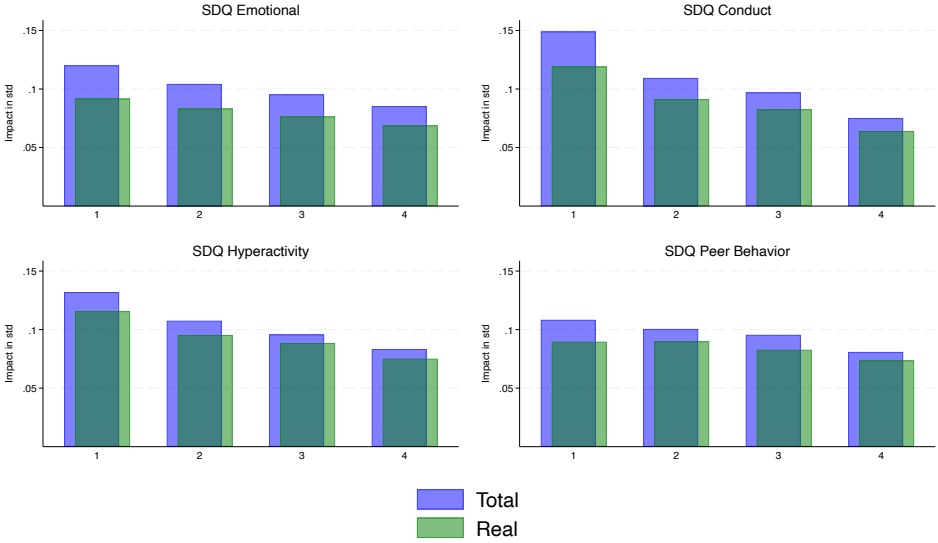
  for $j = 1, ..., J^P_t$ and $P = \{M, F\}$.

- Correlations across measures work through not only N_t, but also
  - Parental skills N^P_t and C^P

Main results and implications

- Find that maternal skills more important when we address contamination concerns, with effects that are twice as large in magnitude
- Simulate the effect of policies - e.g. expansion in child care (Baker et al. 2008) - and find that contamination could explains 10-20% of the *measured* impact on child emotional regulation and behaviour

Evaluation of intervention that affects parent & child skills



Construct

Different types of constructs lead to different types of analyses/results

Construct: Aggregated vs. more disaggregated

The Economic Value of Childhood Socio-Emotional Skills
with Ben Etheridge and Paul Garcia (DEG 2025)

1. A new characterization of early socio-emotional skills (age 10)
2. Relationship between SEmSkills and labour market outcomes (age 26-46)

$\Longrightarrow$ Distinguishing between attention and conduct is important

Measurement Model

- Assume skills are unobserved but we have multiple (error-ridden) measurements
- Following model:

$$\underbrace{Z_{\omega,i,j}}_{\substack{\text{Observed Item}\\ \text{Response}}} = \underbrace{\lambda_{\omega,j}}_{\substack{\text{Factor}\\ \text{Loading}}} \underbrace{\omega_i}_{\substack{\text{(Unobserved)}\\ \text{Ind. Score}}} + \underbrace{\epsilon_{\omega,i,j}}_{\text{Noise}}$$

Factorization Approach

- As is standard (Heckman et al., 2013; Bolt et al., 2021), use **Exploratory Factor Analysis** to determine the number of relevant factors
  - ... allow cross-loading by pooling all age-10 items
  - ... iterative procedure to remove items with low factor loadings (0.4) or which load on too many factors
  - ... the process terminates when no more items can be dropped and results in a system where each factor is aligned with a specific set of items

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  - ... the process terminates when no more items can be dropped and results in a system where each factor is aligned with a specific set of items
- Then we run a **Confirmatory Factor Analysis**:
  - ... impose no cross-loadings (dedicated system)
  - ... obtain Bartlett scores, apply to different subsamples, and derive and compare measures of goodness of fit

Results of Factorization

- Find following factors:
  - Socio-emotional skills (age 10):
    - Attention [alpha: 0.925]
    - Conduct [alpha: 0.931]
    - Emotional[alpha: 0.847]
    - Peer [alpha: 0.823]
  - Cognitive skills (age 10) [alpha: 0.856]
- Distinguish 'attention' from 'conduct', normally conflated into 'externalizing' behaviour

Results of EFA (Age 10)

Items	Attention	Conduct	Emotion	Peer	Cognition
Easily distracted	**0.796**	0.127	0.027	-0.119	-0.046
Fails to finish tasks	**0.786**	-0.040	-0.032	0.065	-0.005
Cannot complete tasks	**0.774**	-0.057	-0.060	0.074	-0.032
Fails to pay attention in class	**0.725**	0.050	-0.090	0.065	-0.102
Fails to show perseverance	**0.717**	0.016	-0.065	0.061	-0.095
Becomes bored during class	**0.698**	0.149	-0.021	0.073	-0.022
Child is daydreaming	**0.677**	-0.136	0.110	0.123	0.017
Forgetful on complex task	**0.609**	-0.043	0.207	-0.011	-0.210
Cannot concentrate on task	**0.582**	-0.001	0.042	0.025	-0.086
Squirmy and fidgety	**0.557**	0.372	0.123	-0.187	0.047
Shows lethargic behaviour	**0.504**	-0.025	0.136	0.289	0.006
Confused or hesitant	0.451	-0.087	0.384	-0.033	-0.278
Displays outbursts of temper	-0.054	**0.801**	0.035	0.068	-0.032
Bullies other children	-0.026	**0.783**	-0.135	0.098	-0.076
Teases other children	0.035	**0.780**	-0.124	0.009	-0.032
Quarrels with other kids	0.043	**0.759**	-0.005	0.137	-0.080
Changes mood quickly	0.020	**0.703**	0.250	-0.009	-0.018
Interferes with others	0.295	**0.637**	-0.104	-0.026	-0.023
Complains about things	0.047	**0.625**	0.121	0.020	-0.037
Sullen or sulky	0.018	**0.624**	0.099	0.255	-0.041
Destroys belongings	0.103	**0.604**	-0.043	0.138	-0.010
Excitable and impulsive	0.130	**0.591**	0.218	-0.346	0.030
Restless or over-active behv.	0.305	**0.542**	0.218	-0.252	0.066
Easily frustrated	0.167	**0.523**	0.207	-0.070	-0.015
Hums or makes odd vocals	0.294	**0.427**	0.014	-0.045	0.065
Rhythmic tapping in class	0.306	0.409	0.038	-0.060	0.072
Cannot negotiate child's behv.	0.288	0.313	-0.129	0.278	0.044
Twitches, mannerisms/tics	0.123	0.244	0.202	0.017	0.052

A simple empirical model (DEG)

- Baseline regression:

$$y_{i,t} = \Gamma\, \Omega_{i,\langle a \rangle} + \beta^{l} X^{l}_{i,t} + \beta^{f} X^{f}_{i} + \upsilon_{i,t},$$

  where $\Omega_{i,\langle a \rangle}$ is a vector of skills measured in childhood (e.g. age 10 cognition and SEmSkills factors)

- Controls:
  - $X^{l}_{i,t}$: life-cycle terms (age/time, gender interactions)
  - X^{f}_{i}: family background (SES, siblings, birth order, teen mother, father present, etc.)
- Key point: $\Omega_{i,\langle a \rangle}$ is **latent** $\Rightarrow$ we estimate skill **scores** $\hat{\Omega}_{i,\langle a \rangle}$ from multiple items

Why multiple items help: measurement error correction (intuition)

- If we regress $y_{i,t}$ on a noisy proxy $\hat{\Omega}$, coefficients are attenuated:

$$\hat{\Gamma}_{\text{naive}} \approx \Gamma \times \underbrace{\frac{\text{Var}(\Omega)}{\text{Var}(\Omega) + \text{Var}(\eta)}}_{\text{attenuation } <1},$$

  where η is measurement noise in the skill proxy.

- With n items loading on the same factor, averaging/latent scoring reduces noise ("over-identifying information").

- Practical rule-of-thumb used in DEG: coefficients on measured skill scores should be **inflated** by

$$\frac{1 + \lambda^2(n-1)}{\lambda^2 n} > 1,$$

  where λ is the average factor loading and n is the number of items.

- Example: for emotional problems $\lambda \approx 0.75$ and $n = 6 \Rightarrow$ inflation factor ≈ 1.2 (about $+20\%$).

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NOTE: This corrects attenuation from measurement error; it does not solve endogeneity/omitted-variable bias

Schooling and Earnings: Association with Age-10 Skills

	Schooling		Earnings		
Attention	−0.648***	−0.221***	−0.092***	−0.037***	−0.027***
	(0.038)	(0.045)	(0.008)	(0.009)	(0.009)
Conduct	0.094***	−0.037	0.052***	0.035***	0.037***
	(0.036)	(0.036)	(0.007)	(0.007)	(0.006)
Emotion	0.025	0.058*	−0.032***	−0.028***	−0.029***
	(0.035)	(0.033)	(0.007)	(0.007)	(0.006)
Peer	0.040	0.025	−0.010	−0.011	−0.014**
	(0.035)	(0.032)	(0.007)	(0.007)	(0.007)
Cognition		0.726***		0.093***	0.060***
		(0.036)		(0.007)	(0.007)
Family SES	0.856***	0.610***	0.107***	0.075***	0.046***
	(0.032)	(0.032)	(0.007)	(0.007)	(0.007)
Yrs School					0.049***
					(0.003)
Background controls	X	X	X	X	X
Mean of Dep. Var.	12.26	12.26	7.17	7.17	7.17
N	6,952	6,952	23,451	23,451	23,451

***p<0.01, **p<0.05, *p<0.1

Schooling and Earnings: Association with Early Skills

- **Schooling**: *-ve* association with attention
- **Earnings**: *+ve* association with conduct
- Explains the '*Breaking Bad*' result in Papageorge et al. (2019) who show a contrasting effect of "externalizing" behaviour on schooling and earnings

4-Factor Model vs. 2-Factor Model

	Schooling		Earnings	
	4-factor	2-factor	4-factor	2-factor
Externalising		**-0.143*** **		**0.026*** **
		[0.034]		**[0.006]**
Attention	-0.221***		-0.027***	
	[0.045]		[0.009]	
Conduct	-0.037		0.037***	
	[0.036]		[0.006]	
Internalising		**0.041**		**-0.049*** **
		[0.031]		**[0.007]**
Emotion	0.058*		-0.029***	
	[0.033]		[0.006]	
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Yrs School			0.049***	0.049***
			[0.003]	[0.003]
Backg. Controls	X	X	X	X
N	6952	6952	23,451	23,451

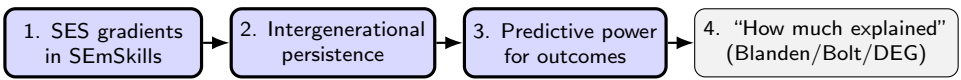
*** p<0.01, ** p<0.05, * p<0.1

Main results and policy implications

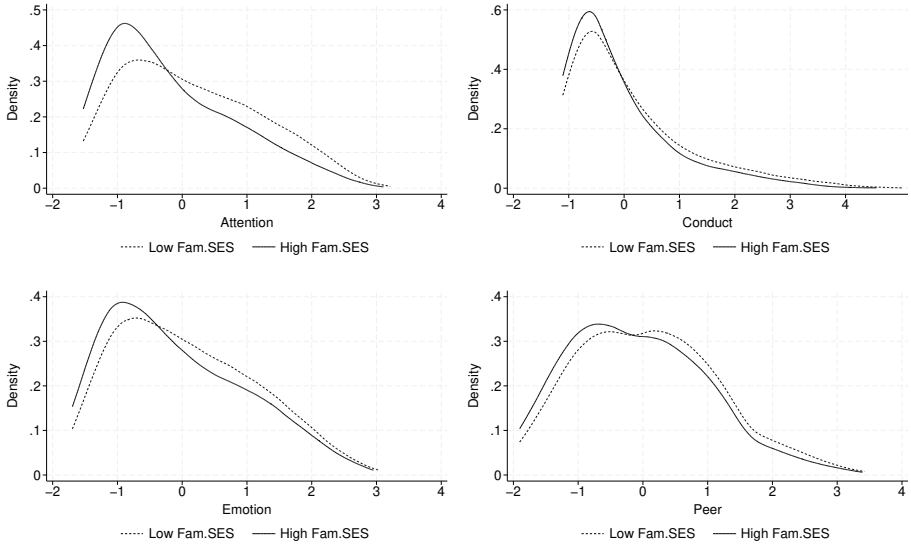
- Early **interventions** should focus more on children with **attention** rather than conduct issues
- Rethink the way in which we deal with 'misbehaviour' esp. in educational contexts, if this is an adaptive response to stressful situations that is valuable in other domains

The SES contribution of SEmSkills

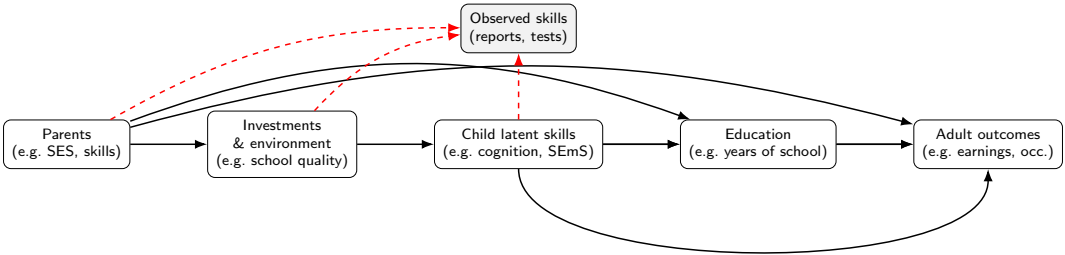
We now discuss three important pieces of evidence:



#1: Distribution of SEmSkills by family SES (DEG 2025)



#2: Transmitted Parent to Child (directly and/or indirectly)



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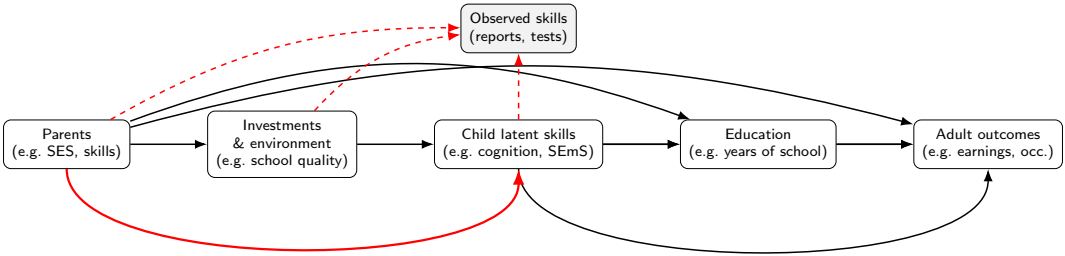

#2: Transmitted Parent to Child (Attanasio et al. 2025)

- **Data:** 1970 British Cohort Study (BCS70), linking cohort members ("parents") to one of their children observed in 2004 (parent age 34)
  - Parents' SEmS measured in childhood (ages 5, 10, 16) using **Rutter A** items; children's SEmSkills measured age 3–16 using **SDQ**-type items in the parent–child survey
- **Skills definition:** two latent socio-emotional factors:
  - **Internalising (INT)** and **Externalising (EXT)** (plus a parental **cognitive** factor)
- Estimate the **measurement system and mobility regression jointly** (factor model + intergenerational regression in one step), to reduce two-step biases
- **Main takeaway:**
  - Strong persistence in **within-dimension** transmission (parent INT → child INT; parent EXT → child EXT) ◂ evidence

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  - If using contemporaneous measures of parent skills, relationships significantly stronger (contamination bias?)
  - Associations rather than evidence of causal relationships

#3: SEmSkills predict complete education and labour-market outcomes

- Childhood SEmS are predictive of education, earnings, and labour-market outcomes
- Very large literature in labour economics and psychology (e.g. Heckman, Stixrud & Urzua 2006, Borghans, Duckworth & Heckman 2008, Almlund, Duckworth, Heckman & Kautz 2011) and psychology (e.g. Lewis, Haworth & Plomin 2014, Alderotti, Rapallini & Traverso 2023)
- Most evidence is not causal, because SEmS are hard to randomise/instrument and hard to measure without bias
- Let's consider DEG as an example

#3: Association with Schooling and Earnings (DEG 2025)

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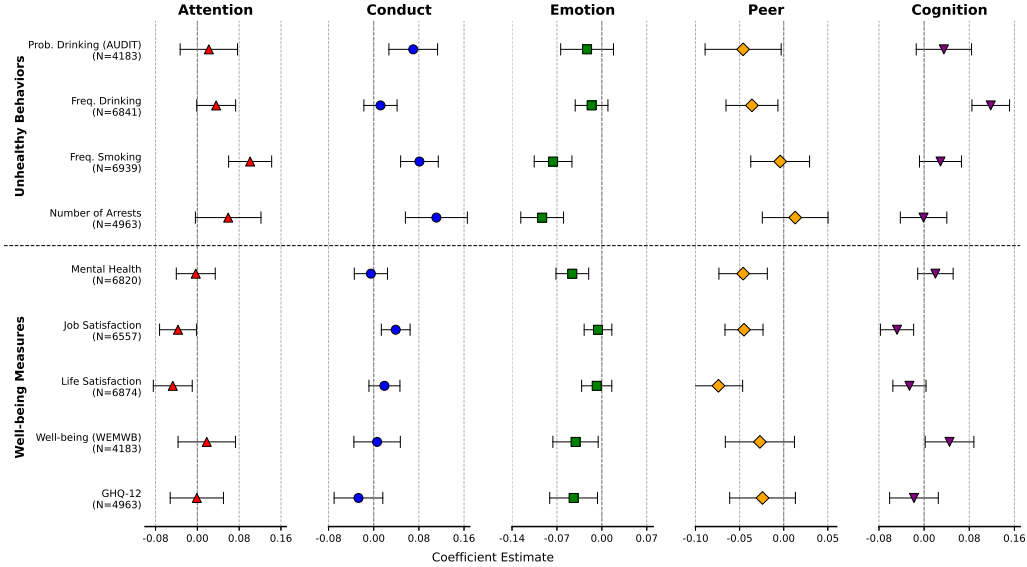
***p<0.01, **p<0.05, *p<0.1

#3: Association with Health and Well-being (DEG 2025)

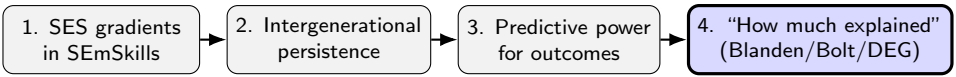


Comments about stylised fact #3

- DEG shows strong **predictive** associations of childhood SEmSkills with education, earnings, and health/well-being
- ... these are mostly **correlations** (reporting/measurement and omitted variables remain)
- Causal evidence exists for **education outcomes**, but adult earnings effects remain harder to pin down Sorrenti et al. 2025

The SES contribution of SEmSkills

Let's get to the final point:



$\Rightarrow$ Discuss differences across studies through **construct**, **measurement**, and **mediators/outcomes**

Blanden et al. (2007)

Data

- British Cohort Study 1970 (BCS70) & National Child Development Study 1958 (NCDS)
- SEmSkills: Rutter scale (internalising/externalising); hyperactivity/restlessness; locus of control; self-esteem – but not obtained through factor analysis

Framework

- IGE-style regression: $\log y^{son} = \beta \log y^{parent} + u$.
- **Sequential accounting**: quantify how much of β is reduced when adding mediators (skills $\rightarrow$ education $\rightarrow$ labour market attachment)
- Results depend on *ordering* and on whether education is treated as a mediator for skills

Main results

- Cognitive variables account for roughly $\sim$**20%** of persistence
- Non-cognitive variables account for roughly $\sim$**10%**, operating mainly **through education**

Bolt et al. (2024)

Data

- National Child Development Study (NCDS)
- SEmSkills: one construct, from behavioural measures (e.g. Rutter)

Framework

- Estimate a **multi-stage model** of (i) skill formation, (ii) education, (iii) lifetime earnings.
- Use the model for **counterfactual mediation-style decomposition**: quantify each channel's contribution to IGE, and how channels operate (e.g. investments $\rightarrow$ cognition $\rightarrow$ education $\rightarrow$ earnings).
- Allows for complementarity between inputs in earnings (CES-type structure)

Main results

- Observed channels explain a large share of IGE: 55% (men) and 68% (women)
- **Education and cognition** account for substantial shares
- **SEmSkills contribute little/negligibly** relative to cognition and education

From "sequential accounting" to structural/mediation decompositions

Sequential accounting (Blanden et al., 2007)

- Start with IGE regression: $\log y^c = \beta \log y^p + u$.
- Add blocks of controls sequentially (skills, education, etc.).
- "Explained" share = reduction in $\hat{\beta}$ when adding mediators.
- **Strengths:**
  - transparent and easy to communicate;
  - low modelling burden.
- **Limits (key for interpretation):**
  - depends on **ordering** of mediators;
  - mixes **direct vs indirect** pathways;
  - sensitive to measurement error

Structural/mediation (Bolt et al., 2024)

- Specify a multi-stage system:

  (skills) $\rightarrow$ (education) $\rightarrow$ (earnings), with invest

- Estimate the joint system (with latent skills and interactions).
- Decompose IGE using **counterfactual mediation** "set channel X to equalised distribution" and recompute implied IGE
- **Strengths:**
  - separates direct/indirect pathways;
  - measurement error and dynamics
- **Limits:** heavier assumptions; simplifications necessary (e.g. one indicator of SEmSkills)

DEG 2025: are adult SES gaps mostly about *endowments* or *returns*?

Data

- 1970 British Cohort Study
- SEmSkills: four dimensions (similar to SDQ), derived using factor analysis

Framework

- Kitagawa-Oaxaca-Blinder decomposition: compare high-SES vs low-SES outcomes:

$$\underbrace{\Delta Y}_{\text{total gap}} = \underbrace{\Delta Y^{\text{endow}}}_{\text{skills/composition}} + \underbrace{\Delta Y^{\text{returns}}}_{\text{coefficients/prices}}$$

- applies correction for measurement error

Main results

- A substantial fraction of the gap is attributed to **endowment differences** (early cognition + SEmSkills), not to systematically different **returns** by SES
- SEmSkills – and mainly **attention problems** – explain about 10% of the difference due to endowments

DEG: how much of SES gaps do early skills explain? (Table 8 / App. F)

	Schooling gap (years)	**Earnings gap** (log points)
Total gap (High SES – Low SES)	1.408	0.198
Explained by endowments (total)	0.708	0.103
Endowment contributions:		
Cognition (age 10)	0.628	0.045
Attention problems	**0.061**	**0.011**
Conduct problems	0.013	−0.006
Emotional problems	0.023	0.004
Peer problems	0.013	0.002

Reconciling the literature: why Blanden, Bolt, and DEG differ

Differences are not "contradictions" — they are about:

1. **Construct**: internalising/externalising vs attention/conduct/emotion/peer
2. **Measurement**: item batteries, latent scores, informants, contamination
3. **What is conditioned on**: education and cognition can absorb part of the SEmSkills channel
4. **Outcome/denominator**: IGE in earnings vs gaps in adult SES outcomes (e.g. employment)

$\Rightarrow$ **Best reading of the evidence: SEmSkills matter, but their measured contribution is often much smaller than cognition and runs mainly through education**

Future research agenda

- **Measurement**: multi-informant integration; contamination
- **Identification**: credible causal designs for SEmSkills; causal mediation analysis
- **Mechanisms**: which parental/school investments move SEmSkills and for whom?
- **Cohort change**: are gradients rising, returns rising, or both?

Thank you!

Time for questions?

Appendix: Sorrenti et al. (ReStud 2025) — setting & design

- **Question:** Can a school-based socio-emotional learning (SEL) program shift *long-run educational trajectories*?
- **Setting:** Zurich, with early ability tracking into *academic high school (Gymnasium)*
- **Design:** cluster randomized experiment at the **school** level:
  - 56 public primary schools randomly assigned within strata to four arms (PATHS, Triple P, both, control).
  - Paper focuses on **PATHS**: treatment = schools assigned to PATHS-only or PATHS+TripleP; control = pure control + TripleP-only.
- **Data:** longitudinal panel + administrative records; $n \approx 1{,}675$.
- **Outcomes:** academic-track attendance at ages 13/15/17; academic high school completion and university enrollment at age 20.

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Appendix: PATHS (Promoting Alternative Thinking Strategies)

- Classroom-based SEL curriculum aiming to reduce disruptive/aggressive behaviour and strengthen emotion regulation.
- Delivered through teacher-run lessons embedded in the curriculum
  - Typically **45-minute lessons twice per week** during Grade 2 (with homework assignments).
  - About **45 hours** of lessons + **20 hours** homework over Grade 2; many schools continued into Grade 3.
- **Implementation support:**
  - Teachers received a **3-day training workshop**.
  - Ongoing coaching + monitoring (multiple lesson observations + feedback).
- **Costs:** low-cost delivery (**$67 per student**).

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Appendix: Main long-run impacts on education (PATHS)

Outcome	Age	Effect (pp)	Interpretation
Attend academic high school (Gymnasium)	13	+2.3	early post-tracking gap
Attend academic high school (Gymnasium)	15	+4.1	effects grow over time
Attend academic high school (Gymnasium)	17	+6.0	cumulative transitions upward
Complete academic high school	20	+5.1 to +7.1	∼20–23% increase
University enrolment	20	+3.6 to +4.0	∼21% increase

- Treated students obtain higher grades but **do not score higher on standardized admission tests** $\Longrightarrow$ improvements on SEmSkills/behaviour

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#2: Transmitted Parent to Child (Attanasio et al. 2025)

	Panel A: Dep. var. = Child Internalising (INT)			
	(1)	(2)	(3)	(4)
Parent INT (during childhood)	0.208***	0.229***	0.115**	0.137*
	(0.067)	(0.069)	(0.057)	(0.078)
Parent EXT (during childhood)	0.032	-0.050		-0.082
	(0.071)	(0.069)		(0.071)
Parent COG (during childhood)			0.127**	0.157**
			(0.049)	(0.052)
Observations	1030	1030	1030	1030
	Panel B: Dep. var. = Child Externalising (EXT)			
	(1)	(2)	(3)	(4)
Parent INT (during childhood)	0.037	-0.025		-0.040
	(0.057)	(0.054)		(0.057)
Parent EXT (during childhood)	0.243***	0.230***		0.243***
	(0.054)	(0.056)		(0.054)
Parent COG (during childhood)			0.146***	0.153***
			(0.037)	(0.041)
Observations	1030	1030	1030	1030