Wings of Growth: A Mindset Intervention in Rural China

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Motivation

GROWTH MINDSET
MISTAKES HELP ME LEARN
FEEDBACK IS VALUABLE
IS THIS MY BEST WORK?
I IMPROVE WITH PRACTICE
I WON'T GIVE UP
FIXED MINDSET
I WANT TO AVOID MAKING MISTAKES
I'LL NEVER BE THAT SMART
I KNOW BEST
THIS IS GOOD ENOUGH
I GIVE UP

Motivation

- The growth mindset intervention, which instill positive belief that human intellectual ability can be nurtured through effort and persistence, spotted a thrive in economics and developmental psychology (Alan et al. 2019; Bettinger et al. 2018; Paunesku et al. 2015; Blackwell et al. 2007; Ganimian 2020; Huillery et al. 2025; Kim et al. 2022; Outes-Leon et al. 2020; Paunesku et al. 2015; Yeager, Hanselman, et al. 2019).

- Previous studies, primarily targeting school-aged children, have shown its positive influence on associated socio-emotional skills, future aspirations, and educational outcomes. However, the overall effectiveness remains a subject of debate (Sisk et al. 2018; Macnamara and Burgoyne 2023; Yeager and Dweck 2020).

  ▷ The effects vary across different samples and contexts

  ▷ Evidence from developing countries is scarce with mixed results (Alan et al. 2019; Ganimian 2020; Outes-Leon et al. 2020)

- We evaluate *Wings of Growth*, a six-week growth mindset intervention targeting disadvantaged students in a rural Chinese county.

Research Question

- How effective is the growth mindset intervention for students in rural China?
- Who would benefit more from the intervention? We examine the role of past parental investment, and other factors.

The Rural Context

- Our experiment was based in a county in Jiangxi Province, covering all 18 middles schools in its rural region.
- We targeted students from grade 7 and 8. Approximately 51% of the students are males. 25.6% of the students have one parent being the migrant worker, while 25.7% have both parents being the migrant worker.
- On average, students come from more disadvantaged families compared to a national representative sample of grade 7 students in CEPS (2013-2014).

Comparison **Photos**

Timeline of the Intervention

- Collecting admin data for randomization & test scores of 2023 Fall [March 2024]
- Recruitment and pilot lectures [April 2024]
- Baseline student survey [April 2024]
- Training session [April 2024]
- Formal Intervention [late April - Early June 2024]

  ▷ A total of 76 classes were randomly assigned into two treatment arms. 41 classes in the treated group, 35 classes in the control group. Randomization performed based on the school administrative data of 2023 Fall.

  ▷ The lectures were implemented as part of the regular after-class services.
- Endline student survey 1 & Instructors' classroom record [June 2024]
- Collecting test scores of 2024 Spring [October 2024]
- Endline student survey 2 & Class teacher survey [December 2024]
- Collecting test scores of 2024 Fall [February 2025]

Intervention Photos **Timeline**

Summary of the Curriculum

- The curriculum consists of six weekly lectures, each lasted 45 minutes. The lectures involve three key components that help cultivating a growth mindset:
  1. Incremental theory of intelligence (Dweck and Leggett 1988) and its supporting evidence (L1)
  2. Narratives that emphasized the importance of sustained effort and perseverance while downplaying external constraints (L2, L3, L4)
  3. Tools that operationalize a growth mindset: the idea of deliberate practice, techniques to overcome challenges, etc. (L2, L3, L5, L6)

Details of L1

- The lecture content was developed primarily based on materials used in Huillery et al. 2025, and was adapted to fit the context of our study.

- Instructional methods include videos, case studies, scientific evidence, as well as in-class games and discussions. Additionally, a booklet was created to provide students with after-class assignments which relate to the content of each lecture.

Student survey

- Mindset measure: 3-item growth mindset scale (Dweck 2006; Dweck 2013)
- Socio-emotional skills: locus of control (CEPS student survey), grit (Duckworth and Quinn 2009); self-esteem (Rosenberg 1965);
- Educational and professional aspirations (CEPS student survey)
- Engagement in learning: study time, effort invested in learning and homework management (Xu 2008)
- Demographics
- Social networks: friends and siblings
- Family socio-economic status
- Experienced parenting practices
- Cognitive ability (Condon and Revelle 2014)
- Social desirability bias (SDB) scores: 13-item version of the Marlowe-Crowne module (Reynolds 1982)

Overview of Data Source

- **Administrative data**
  - Test scores from municipal-level final exams spanning three consecutive semesters
  - Demographics and family information (used for randomization) **Balance Check**
  - Average high school entrance exam scores in 2023 for each school
- **Instructors' classroom records**
  - Attendance
  - Involvement in class: assignment submission, overall attentiveness, overall engagement
- **Class teacher survey**
  - Students' parental marital status

Outcomes of Interest

- **Socio-emotional skills**

  Mindset, locus of control, grit and self-esteem. We applied the methodology from Anderson (2008) to construct summary index for each.

- **Academic performance**

- **Aspirations**

  Whether the student aspires to attend a key high school, complete university degree, and pursue a medium- or high-skill job.

The Estimation Strategy

- We estimate the following ordinary least square (OLS) regression:

$$Y_{ijcs} = \beta_0 + \beta_1 \cdot T_{jcs} + \beta_2 \cdot Y^0_{ijcs} + \gamma \cdot X_{ijcs} + \epsilon_{ijcs}$$

  Covariates include gender, cognitive ability, family financial condition, father's education, mother's education, school geographic distance to the county government, and the average high school entrance exam scores in 2023 at the affiliated school. SEs are clustered at the class level, which is the unit of randomization.

- Given the high attendance rate, the intention-to-treat (ITT) effect is expected to be similar to the treatment-on-treat effect.

Short Term Effects: Main Outcomes

Short Term Effects: Main Outcomes

	Obs.	Control	Treatment Effect	Original p-value	RI p-value
Panel A: Socio-emotional skills					
Growth mindset	2367	-0.150 [1.026]	0.279*** (0.045)	0.000	0.000
Locus of control	2332	-0.083 [0.968]	0.155*** (0.041)	0.000	0.000
Grit (self-report)	2365	-0.058 [0.967]	0.089** (0.044)	0.046	0.045
Self-esteem	2362	0.034 [0.986]	-0.073 (0.049)	0.137	0.141
Panel B: Academic performance					
Score	2354	0.036 [1.024]	-0.021 (0.027)	0.448	0.451
Panel C: Aspiration					
Aspiration (index)	2361	0.002 [0.996]	0.002 (0.031)	0.957	0.958

Multiple Hypothesis Testing

Short Term: Heterogeneous Treatment Effects

	Gender			School Year		
	M	T	T · M	G7	T	T · G7
Socio-emotional Skills						
Growth Mindset	0.044	0.251***	0.055	0.041	0.268***	0.021
	(0.053)	(0.060)	(0.077)	(0.070)	(0.061)	(0.085)
Locus of control	-0.137**	0.089*	0.132*	-0.007	0.152***	0.007
	(0.059)	(0.048)	(0.076)	(0.052)	(0.053)	(0.090)
Grit (self-report)	0.145**	0.012	0.154**	0.060	0.122**	-0.073
	(0.058)	(0.056)	(0.075)	(0.070)	(0.054)	(0.090)
Self-esteem	0.153***	-0.053	-0.040	-0.002	-0.044	-0.063
	(0.051)	(0.059)	(0.073)	(0.068)	(0.061)	(0.097)
Academic Performance						
Score	-0.013	-0.028	0.015	-0.012	-0.033	0.026
	(0.019)	(0.029)	(0.026)	(0.040)	(0.035)	(0.053)
Aspiration						
Aspiration (index)	-0.009	0.023	-0.044	-0.001	0.013	-0.025
	(0.046)	(0.039)	(0.060)	(0.047)	(0.044)	(0.068)

Short Term: Heterogeneous Treatment Effects

	Baseline Score			Parenting		
	$\mathbb{1}_{>p50}$	T	T · $\mathbb{1}_{>p50}$	P	T	T · P
Socio-emotional Skills						
Growth Mindset	0.034	0.153**	0.259***	0.057**	0.274***	0.076**
	(0.055)	(0.062)	(0.076)	(0.025)	(0.043)	(0.034)
Locus of control	0.253***	0.184***	-0.043	0.031	0.155***	0.028
	(0.063)	(0.055)	(0.082)	(0.035)	(0.042)	(0.047)
Grit (self-report)	0.090	0.042	0.097	0.027	0.073	0.084**
	(0.057)	(0.066)	(0.078)	(0.029)	(0.045)	(0.041)
Self-esteem	-0.037	-0.110*	0.069	0.127***	-0.092*	-0.065
	(0.046)	(0.057)	(0.065)	(0.029)	(0.050)	(0.039)
Academic Performance						
Score	0.066*	-0.023	0.011	0.012	-0.022	0.008
	(0.037)	(0.035)	(0.039)	(0.014)	(0.027)	(0.019)
Aspiration						
Aspiration (index)	0.396***	0.033	-0.039	0.041**	-0.001	0.020
	(0.043)	(0.049)	(0.056)	(0.020)	(0.034)	(0.026)

Parenting Index

6 months follow-up: Main Outcomes

6 months follow-up: Main Outcomes

	Obs.	Control	Treatment Effect	Original p-value	RI p-value
Panel A: Socio-emotional Skills					
Growth mindset	2251	-0.085 [1.035]	0.155*** (0.056)	0.007	0.007
Locus of control	2208	-0.052 [0.947]	0.079* (0.044)	0.073	0.071
Grit (self-report)	2249	-0.006 [0.943]	0.003 (0.047)	0.945	0.942
Self-esteem	2238	0.062 [0.923]	-0.117** (0.046)	0.013	0.015
Panel B: Academic performance					
Score	2221	0.023 [1.013]	0.006 (0.033)	0.851	0.849
Panel C: Aspiration					
Aspiration (index)	2247	-0.005 [0.995]	0.039 (0.034)	0.262	0.254

- Results are similar to our short term findings.

Multiple Hypothesis Testing

6 months follow-up: Heterogeneous Treatment Effects

	Gender			School Year		
	M	T	T · M	G7	T	T · G7
Socio-emotional Skills						
Growth Mindset	0.190***	0.178**	-0.046	-0.014	0.182***	-0.061
	(0.057)	(0.068)	(0.072)	(0.092)	(0.065)	(0.117)
Locus of control	-0.030	0.073	0.012	0.034	0.117*	-0.084
	(0.058)	(0.053)	(0.082)	(0.067)	(0.059)	(0.093)
Grit (self-report)	0.282***	-0.011	0.028	0.050	0.072	-0.153
	(0.045)	(0.060)	(0.067)	(0.055)	(0.066)	(0.097)
Self-esteem	0.206***	-0.103	-0.027	0.036	-0.031	-0.191*
	(0.053)	(0.066)	(0.075)	(0.070)	(0.049)	(0.097)
Academic Performance						
Score	-0.040	-0.003	0.019	-0.015	-0.033	0.086
	(0.026)	(0.042)	(0.034)	(0.054)	(0.042)	(0.070)
Aspiration						
Aspiration (index)	-0.097**	0.084*	-0.089	0.016	0.077*	-0.084
	(0.046)	(0.046)	(0.062)	(0.058)	(0.041)	(0.076)

6 months follow-up: Heterogeneous Treatment Effects

	Baseline Score			Parenting		
	$\mathbb{1}_{>p50}$	T	T · $\mathbb{1}_{>p50}$	P	T	T · P
Socio-emotional Skills						
Growth Mindset	-0.183***	0.025	0.246***	0.034	0.153***	0.021
	(0.053)	(0.067)	(0.067)	(0.035)	(0.057)	(0.043)
Locus of control	0.227***	0.082	0.003	0.017	0.063	0.075*
	(0.069)	(0.062)	(0.087)	(0.031)	(0.043)	(0.043)
Grit (self-report)	0.106*	-0.008	0.028	0.055	0.010	0.025
	(0.057)	(0.064)	(0.084)	(0.039)	(0.047)	(0.048)
Self-esteem	0.006	-0.112	-0.009	0.075	-0.112	0.007
	(0.058)	(0.071)	(0.084)	(0.025)	(0.047)	(0.043)
Academic Performance						
Score	0.024	-0.019	0.049	0.016	0.005	0.006
	(0.045)	(0.042)	(0.046)	(0.015)	(0.034)	(0.019)
Aspiration						
Aspiration (index)	0.447***	0.009	0.073	0.056**	0.042	-0.027
	(0.053)	(0.051)	(0.064)	(0.024)	(0.037)	(0.030)

Social Desirability Bias

Endlines		Growth Mindset	Locus of Control	Grit (self-report)	Self-esteem	Aspiration (index)
Short-term	High SDB	0.126**	0.124**	0.179***	0.147**	0.020
		(0.056)	(0.054)	(0.055)	(0.062)	(0.048)
	Treatment	0.285***	0.159***	0.059	-0.078	-0.021
		(0.048)	(0.054)	(0.049)	(0.060)	(0.045)
	Treatment·High SDB	-0.020	-0.014	0.060	0.004	0.048
		(0.067)	(0.075)	(0.074)	(0.078)	(0.064)
	Controls	Yes	Yes	Yes	Yes	Yes
	Baseline outcome	Yes	Yes	Yes	Yes	Yes
	Observations	2367	2332	2365	2362	2361
	R-squared	0.222	0.181	0.266	0.179	0.509
6 months follow-up	High SDB	0.355***	0.114**	0.478***	0.284***	0.129***
		(0.069)	(0.050)	(0.055)	(0.056)	(0.040)
	Treatment	0.184**	0.025	-0.023	-0.124**	0.046
		(0.070)	(0.052)	(0.052)	(0.061)	(0.038)
	Treatment·High SDB	-0.079	0.133*	0.061	0.011	-0.022
		(0.082)	(0.067)	(0.075)	(0.083)	(0.055)
	Controls	Yes	Yes	Yes	Yes	Yes
	Baseline outcome	Yes	Yes	Yes	Yes	Yes
	Observations	2251	2208	2249	2238	2247
	R-squared	0.200	0.133	0.294	0.152	0.488

Mechanism: Understanding the Null Effect on Academic Performance

- Suggestive evidence: there is no significant treatment difference in students' engagement in learning either in the short term or medium term

Endlines		Study Time	Effort	Homework Management
Short-term	Treatment	-0.146	-0.053	0.040
		(0.088)	(0.060)	(0.045)
	Controls	Yes	Yes	Yes
	Baseline outcome	Yes	Yes	Yes
	Observations	2233	2091	2363
	R-squared	0.059	0.350	0.332
6 months later	Treatment	-0.052	-0.033	-0.003
		(0.077)	(0.056)	(0.059)
	Controls	Yes	Yes	Yes
	Baseline outcome	Yes	Yes	Yes
	Observations	2106	1958	2248
	R-squared	0.065	0.238	0.261

Conclusion

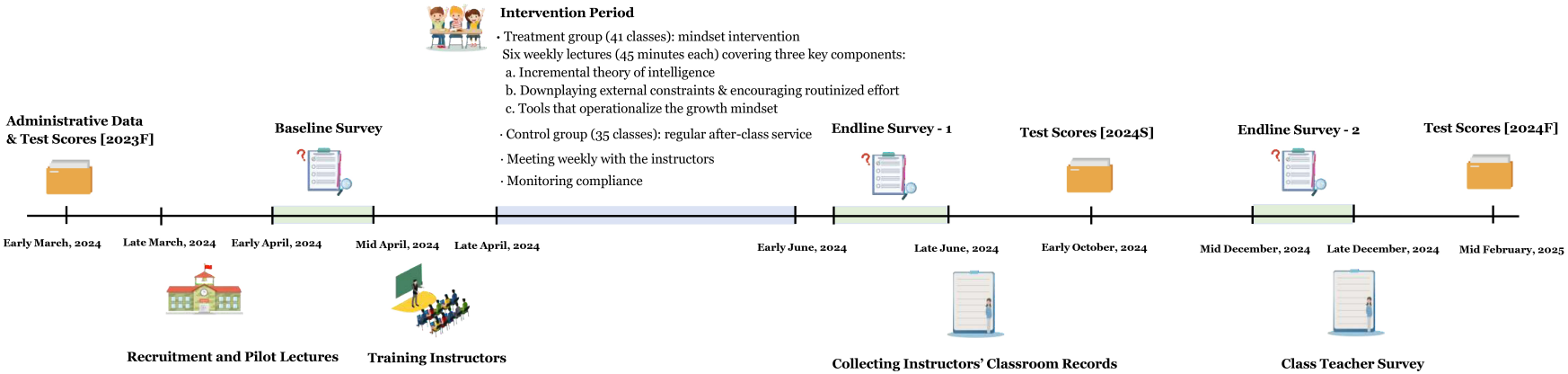
- A high-quality and intensive mindset intervention does not necessarily yield improvements in students' academic performance, despite successfully strengthening their growth mindset and enhancing certain associated socio-emotional skills.

- Although we only observe sustained improvements in students' socioemotional skills, this should not be viewed as a failure of the intervention in reducing education inequality.
  ▷ These socioemotional skills may play an important role for students' education attainment and labor market outcome.

- The complementarity we find between parental involvement and our mindset intervention highlights the importance of parental investment.

Appendix

Timeline of *Wings of Growth*



Return

Intervention Photos

Return

Supplementary Experiment

- We employ a task of searching number pairs that add up to 100 used in Alan et al. (2019).

Big Grid

64	23	13	47	88
48	79	46	17	26
24	32	83	53	52
69	74	30	71	63
81	18	43	72	55

Small Grid

29	63	22
67	34	71
37	66	33

- All students began with a difficult task in the first round. In the subsequent five rounds, they could continue with the difficult task or switch to an easier task with lower reward.
- Grit was evaluated based on two aspects: willingness to seek challenges (task choice in each round and overall) and perseverance through setbacks (task choice after failure).

Return

Balance Check

	Obs.	Control	Treatment	Diff (T-C)
Male (%)	2543	0.498	0.513	0.015
		[0.500]	[0.500]	(0.018)
Age	2543	13.894	13.838	-0.056
		[0.681]	[0.697]	(0.116)
Father's education (HS+)	2527	0.074	0.123	0.048***
		[0.263]	[0.328]	(0.015)
Mother's education (HS+)	2514	0.088	0.104	0.016
		[0.283]	[0.306]	(0.012)
Parents-migrant worker (father or mother)	2497	0.244	0.266	0.022
		[0.430]	[0.442]	(0.018)
Parents-migrant worker (both)	2497	0.268	0.248	-0.019
		[0.443]	[0.432]	(0.026)
Family financial condition	2543	1.867	1.860	-0.007
		[0.384]	[0.405]	(0.037)
Cognitive ability	2484	0.055	-0.044	-0.099
		[1.047]	[0.958]	(0.082)
Socio-emotional skills				
Growth mindset	2543	-0.017	0.014	0.031
		[0.992]	[1.006]	(0.048)
Locus of control	2496	-0.003	0.002	0.005
		[0.982]	[1.015]	(0.043)
Grit (self-report)	2541	-0.018	0.014	0.032
		[1.011]	[0.992]	(0.052)
Self-esteem	2538	0.009	-0.007	-0.017
		[0.960]	[1.031]	(0.057)
Academic performance				
Score - baseline	2543	0.004	-0.003	-0.007
		[1.032]	[0.974]	(0.061)
Aspiration				
Aspiration (index)	2535	0.005	-0.004	-0.008
		[0.997]	[1.002]	(0.047)

Return

Comparison with G7 Sample in CEPS

	Wings of Growth	CEPS Urban	Diff	CEPS Rural	Diff
Male (%)	0.506	0.519	-0.012	0.518	-0.012
	[0.500]	[0.500]	(0.012)	[0.500]	(0.012)
Father's education (HS+)	0.101	0.449	-0.347***	0.227	-0.126***
	[0.302]	[0.497]	(0.024)	[0.419]	(0.016)
Mother's education (HS+)	0.097	0.378	-0.281***	0.170	-0.073***
	[0.296]	[0.485]	(0.023)	[0.376]	(0.016)
Parents-migrant worker (father or mother)	0.256	0.121	0.135***	0.135	0.122***
	[0.437]	[0.327]	(0.011)	[0.341]	(0.013)
Parents-migrant worker (both)	0.257	0.081	0.176***	0.137	0.119***
	[0.437]	[0.272]	(0.016)	[0.344]	(0.019)
Family financial condition	1.863	1.921	-0.058**	1.769	0.094***
	[0.396]	[0.457]	(0.026)	(0.526)	(0.029)

Return

The Rural Context

Return

Correction for Multiple Hypothesis Testing

Endlines		Original p-value	FWER adjusted p-value
Short-term	**Panel A1: Socio-emotional Skills**		
	Growth mindset	0.000	0.000
	Locus of control	0.000	0.003
	Grit (self-report)	0.046	0.194
	Self-esteem	0.137	0.371
	Panel B1: Academic Performance		
	Score	0.448	0.712
	Panel C1: Aspiration		
	Aspiration (index)	0.957	0.956
Medium-term	**Panel A2: Socio-emotional Skills**		
	Growth mindset	0.007	0.055
	Locus of control	0.073	0.275
	Grit (self-report)	0.945	0.979
	Self-esteem	0.013	0.075
	Panel B2: Academic Performance		
	Score	0.851	0.979
	Panel C2: Aspiration		
	Aspiration (index)	0.262	0.603

Return ST **Return MT**

Factor Loadings for PCA Measures: Parenting

	Parenting
Father asks about things happened at school	0.254
Father asks about the relationship between you and your friends	0.270
Father asks about the relationship between you and your teachers	0.270
Father talks about your feelings	0.277
Father talks about your worries and troubles	0.271
Father checks up on your homework	0.200
Father gives instruction on your homework	0.202
Mother asks about things happened at school	0.283
Mother asks about the relationship between you and your friends	0.303
Mother asks about the relationship between you and your teachers	0.306
Mother talks about your feelings	0.307
Mother talks about your worries and troubles	0.305
Mother checks up on your homework	0.228
Mother gives instruction on your homework	0.233

Return

Attrition

Endlines		Endline Survey			Test Score (Administrative)		
		G7	G8	Aggregate	G7	G8	Aggregate
Short-term	**Sample**						
	Control	491	588	1079	497	610	1107
	Treatment	661	713	1374	671	729	1400
	Full	1152	1301	2453	1168	1339	2507
	Attrition						
	Control	0.028	0.044	0.037	0.016	0.008	0.012
	Treatment	0.029	0.039	0.034	0.015	0.018	0.016
	Full			0.035			0.014
Medium-term	**Sample**						
	Control	466	566	1032	477	581	1058
	Treatment	612	682	1294	645	701	1346
	Full	1078	1248	2326	1122	1282	2404
	Attrition						
	Control	0.077	0.080	0.079	0.055	0.055	0.055
	Treatment	0.101	0.081	0.091	0.053	0.055	0.054
	Full			0.085			0.055

Return

Differential Attrition Test

	Endline Survey 1	Score 2024S	Endline Survey 2	Score 2024F
Treatment	-0.002	0.005	0.012	-0.001
	(0.010)	(0.005)	(0.018)	(0.011)
Observations	2543	2543	2543	2543
R-squared	0.000	0.000	0.001	0.000

Return

Selective Attrition Test - Short Term

	Endline Survey 1			Score 2024S		
	Control	Treatment	Diff (T-C)	Control	Treatment	Diff (T-C)
Male	0.497	0.516	0.019	0.499	0.514	0.015
	[0.500]	[0.500]	(0.019)	[0.500]	[0.500]	(0.018)
Age	13.888	13.835	-0.053	13.894	13.836	-0.059
	[0.681]	[0.701]	(0.117)	[0.679]	[0.698]	(0.116)
Father's education (HS+)	0.075	0.121	0.046***	0.074	0.123	0.050***
	[0.264]	[0.326]	(0.015)	[0.261]	[0.329]	(0.015)
Mother's education (HS+)	0.090	0.105	0.015	0.089	0.104	0.015
	[0.287]	[0.307]	(0.013)	[0.285]	[0.305]	(0.012)
Parents-migrant worker (father or mother)	0.241	0.268	0.027	0.241	0.266	0.025
	[0.428]	[0.443]	(0.019)	[0.428]	[0.442]	(0.019)
Parents-migrant worker (both)	0.270	0.247	-0.023	0.269	0.249	-0.020
	[0.444]	[0.431]	(0.026)	[0.444]	[0.432]	(0.026)
Family financial condition	1.868	1.861	-0.007	1.868	1.862	-0.006
	[0.384]	[0.406]	(0.037)	[0.384]	[0.404]	(0.037)
Cognitive ability	0.066	-0.031	-0.097	0.061	-0.039	-0.100
	[1.048]	[0.958]	(0.085)	[1.048]	[0.961]	(0.083)
Socio-emotional skills						
Growth Mindset	-0.016	0.019	0.036	-0.002	0.013	0.015
	[0.987]	[1.003]	(0.050)	[0.978]	[1.000]	(0.049)
Locus of Control	0.014	0.008	-0.006	0.005	0.007	0.002
	[0.979]	[1.012]	(0.043)	[0.977]	[1.018]	(0.044)
Grit (self-report)	-0.016	0.031	0.047	-0.006	0.021	0.027
	[1.000]	[0.984]	(0.052)	[1.002]	[0.989]	(0.053)
Self esteem	0.020	0.004	-0.016	0.012	-0.001	-0.013
	[0.955]	[1.018]	(0.059)	[0.952]	[1.024]	(0.058)
Academic Performance						
Score	0.032	0.019	-0.013	0.017	-0.000	-0.017
	[1.022]	[0.973]	(0.062)	[1.026]	[0.974]	(0.061)
Aspiration						
Aspiration(index)	0.229	0.017	-0.005	0.011	-0.000	-0.012
	[0.991]	[0.997]	(0.046)	[0.995]	[1.000]	(0.047)

Return

Selective Attrition Test - Medium Term

	Endline Survey 2			Score 2024F		
	Control	Treatment	Diff (T-C)	Control	Treatment	Diff (T-C)
Male	0.508	0.513	0.005	0.502	0.520	0.018
	[0.500]	[0.500]	(0.020)	[0.500]	[0.500]	(0.019)
Age	13.888	13.837	-0.051	13.889	13.839	-0.051
	[0.674]	[0.697]	(0.117)	[0.682]	[0.701]	(0.117)
Father's education (HS+)	0.072	0.121	0.049***	0.074	0.120	0.047***
	[0.258]	[0.326]	(0.014)	[0.262]	[0.326]	(0.015)
Mother's education (HS+)	0.090	0.106	0.016	0.090	0.101	0.011
	[0.286]	[0.308]	(0.013)	[0.287]	[0.302]	(0.012)
Parents-migrant worker (father or mother)	0.240	0.271	0.031	0.243	0.268	0.025
	[0.427]	[0.445]	(0.020)	[0.429]	[0.443]	(0.019)
Parents-migrant worker (both)	0.262	0.241	-0.022	0.259	0.242	-0.017
	[0.440]	[0.428]	(0.025)	[0.438]	[0.429]	(0.025)
Family financial condition	1.866	1.869	0.002	1.865	1.867	0.002
	[0.388]	[0.403]	(0.038)	[0.389]	[0.402]	(0.037)
Cognitive ability	0.061	-0.044	-0.105	0.064	-0.041	-0.105
	[1.055]	[0.963]	(0.086)	[1.050]	[.959]	(0.085)
Socio-emotional skills						
Growth Mindset	0.005	0.017	0.012	0.003	0.019	0.015
	[0.981]	[0.995]	(0.049)	[0.985]	[1.002]	(0.048)
Locus of Control	0.009	0.007	-0.002	0.006	0.005	-0.000
	[0.982]	[1.027]	(0.047)	[0.975]	[1.013]	(0.045)
Grit (self-report)	0.008	0.015	0.008	-0.007	0.018	0.026
	[1.002]	[1.002]	(0.055)	[1.010]	[0.996]	(0.054)
Self esteem	0.020	0.009	-0.010	0.015	0.002	-0.012
	[0.953]	[1.024]	(0.059)	[0.959]	[1.013]	(0.058)
Academic Performance						
Score	0.049	0.022	-0.026	0.040	0.015	-0.025
	[1.018]	[0.970]	(0.062)	[1.024]	[0.971]	(0.064)
Aspiration						
Aspiration(index)	0.027	0.001	-0.026	0.031	0.003	-0.028
	[0.999]	[1.003]	(0.048)	[0.998]	[1.003]	(0.046)

Return

Bounding Exercise

Endlines		Obs.	Lower	Upper	Unadjusted TE
Short-term	**Panel A1: Socio-emotional Skills**				
	Growth Mindset	2454	0.265***	0.299***	0.279***
			(0.044)	(0.043)	(0.045)
	Locus of control	2418	0.136***	0.170***	0.155***
			(0.040)	(0.040)	(0.041)
	Grit (self-report)	2452	0.082*	0.116**	0.089**
			(0.043)	(0.044)	(0.044)
	Self-esteem	2449	-0.088*	-0.054	-0.073
			(0.048)	(0.047)	(0.049)
	Panel B1: Academic Performance				
	Score	2454	-0.033	-0.019	-0.021
			(0.028)	(0.027)	(0.027)
	Panel C1: Aspiration				
	Aspiration (index)	2448	-0.012	0.021	0.002
			(0.031)	(0.031)	(0.031)
Medium-term	**Panel A2: Socio-emotional Skills**				
	Growth Mindset	2454	0.104*	0.186***	0.155***
			(0.052)	(0.051)	(0.056)
	Locus of control	2418	0.035	0.121***	0.079*
			(0.040)	(0.039)	(0.044)
	Grit (self-report)	2452	-0.048	0.034	0.003
			(0.044)	(0.043)	(0.047)
	Self-esteem	2449	-0.159***	-0.074*	-0.117**
			(0.044)	(0.042)	(0.046)
	Panel B2: Academic Performance				
	Score	2454	-0.042	0.011	0.006
			(0.032)	(0.031)	(0.033)
	Panel C2: Aspiration				
	Aspiration (index)	2448	-0.011	0.071*	0.039
			(0.034)	(0.034)	(0.034)

Return

Spillover Effect - Network

Endlines		Obs.	#Treated Friends	T	T · #Treated Friends
Short-term	**Panel A1: Socio-emotional Skills**				
	Growth Mindset	2348	0.044	0.156**	-0.000
			(0.038)	(0.072)	(0.042)
	Locus of control	2314	0.051	0.142**	-0.039
			(0.041)	(0.067)	(0.043)
	Grit (self-report)	2346	-0.023	0.025	0.040
			(0.043)	(0.060)	(0.044)
	Self-esteem	2343	0.069*	-0.137*	-0.042
			(0.040)	(0.071)	(0.043)
	Panel B1: Academic Performance				
	Score	2335	-0.018	-0.044	0.023
			(0.018)	(0.036)	(0.019)
	Panel C1: Aspiration				
	Aspiration (index)	2343	0.063**	-0.019	-0.051*
			(0.028)	(0.047)	(0.039)
Medium-term	**Panel A2: Socio-emotional Skills**				
	Growth Mindset	2230	-0.079	0.145*	0.077
			(0.052)	(0.074)	(0.054)
	Locus of control	2188	0.051	0.079	-0.043
			(0.040)	(0.069)	(0.043)
	Grit (self-report)	2228	-0.022	0.002	0.018
			(0.032)	(0.070)	(0.036)
	Self-esteem	2217	-0.004	-0.118*	0.003
			(0.052)	(0.064)	(0.054)
	Panel B2: Academic Performance				
	Score	2200	-0.013	-0.048	0.028
			(0.021)	(0.040)	(0.022)
	Panel C2: Aspiration				
	Aspiration (index)	2227	-0.029	-0.015	0.042
			(0.026)	(0.053)	(0.030)

Return

Spillover Effect - Siblings

Endlines		Obs.	#Treated Siblings	T	T · #Treated Siblings
Short-term	**Panel A1: Socio-emotional Skills**				
	Growth Mindset	2041	0.035	0.300***	0.006
			(0.157)	(0.046)	(0.188)
	Locus of control	2012	0.032	0.142***	0.009
			(0.176)	(0.041)	(0.208)
	Grit (self-report)	2040	-0.022	0.104**	-0.035
			(0.126)	(0.047)	(0.176)
	Self-esteem	2037	-0.051	-0.087*	0.027
			(0.076)	(0.051)	(0.131)
	Panel B1: Academic Performance				
	Score	2031	0.001	-0.020	-0.015
			(0.064)	(0.030)	(0.072)
	Panel C1: Aspiration				
	Aspiration (index)	2037	-0.039	0.014	-0.102
			(0.086)	(0.035)	(0.143)
Medium-term	**Panel A2: Socio-emotional Skills**				
	Growth Mindset	1949	0.051	0.187***	0.066
			(0.188)	(0.058)	(0.223)
	Locus of control	1914	0.025	0.060	-0.065
			(0.154)	(0.051)	(0.199)
	Grit (self-report)	1948	0.132	0.041	-0.252
			(0.114)	(0.050)	(0.166)
	Self-esteem	1939	-0.134	-0.126**	-0.009
			(0.143)	(0.050)	(0.196)
	Panel B2: Academic Performance				
	Score	1925	-0.124	0.001	0.158
			(0.095)	(0.033)	(0.106)
	Panel C2: Aspiration				
	Aspiration (index)	1947	0.146	0.056	-0.269*
			(0.113)	(0.036)	(0.157)

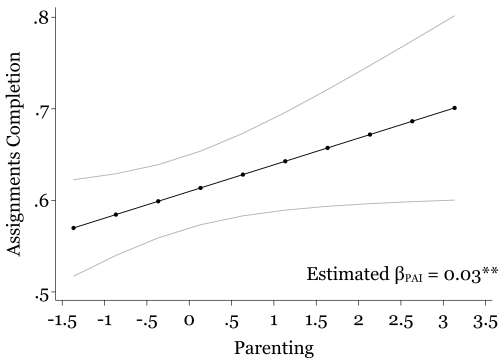
Return

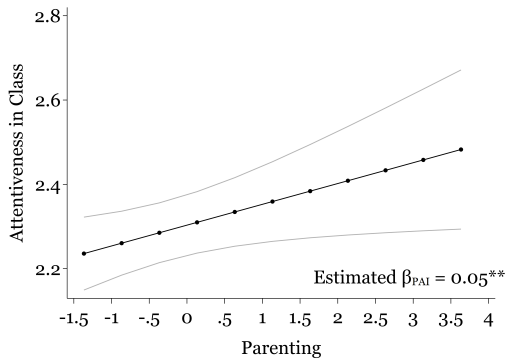
Test of Channel 1

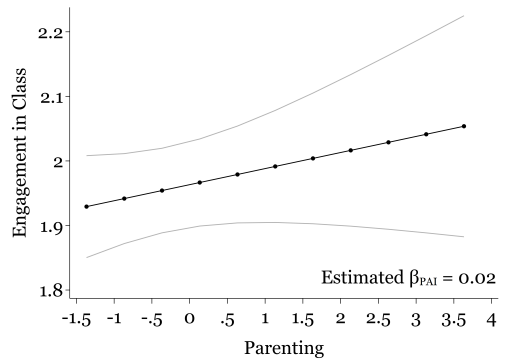
Endlines		Parenting		
		P	T	T · P
Short-term	**Panel A1: Socio-emotional Skills**			
	Growth mindset	0.055**	0.287***	0.072**
		(0.026)	(0.042)	(0.035)
	Locus of control	0.031	0.151***	0.019
		(0.035)	(0.041)	(0.048)
	Grit (self-report)	0.024	0.073	0.083**
		(0.028)	(0.045)	(0.040)
	Self-esteem	0.133***	-0.090*	-0.067*
		(0.030)	(0.050)	(0.040)
	Panel B1: Academic Performance			
	Score	0.014	-0.022	0.009
		(0.014)	(0.027)	(0.019)
	Panel C1: Aspiration			
	Aspiration (index)	0.043**	0.002	0.025
		(0.020)	(0.034)	(0.026)
Medium-term	**Panel A2: Socio-emotional Skills**			
	Growth mindset	0.035	0.160***	0.021
		(0.034)	(0.056)	(0.043)
	Locus of control	0.021	0.060	0.066
		(0.031)	(0.043)	(0.044)
	Grit (self-report)	0.050	0.010	0.029
		(0.038)	(0.047)	(0.048)
	Self-esteem	0.071***	-0.113**	0.004
		(0.025)	(0.048)	(0.044)
	Panel B2: Academic Performance			
	Score	0.014	0.012	0.005
		(0.015)	(0.034)	(0.019)
	Panel C2: Aspiration			
	Aspiration (index)	0.048**	0.044	-0.022
		(0.024)	(0.037)	(0.030)

Return

Test of Channel 2







Notes: Each graph illustrates the effect of a one standard deviation increase in parenting on (a) assignments completion (hand in all six assignments); (b) evaluation of the student's overall attentiveness during the lectures, rated from 1 (not attentive) to 3 (very attentive); (c) evaluation of the student's level of engagement during the lectures, rated from 1 (not engaged) to 3 (very engaged). The fitted regression lines are estimated based on OLS regressions, controlling for gender, cognitive ability, family financial condition, two dummy variables indicating whether the father's education and the mother's education are high school or higher, school geographic distance to the county government, the average high school entrance exam scores in 2023 at the affiliated school, and instructor fixed effects. Standard errors are clustered at the class level, which corresponds to the level of randomization. The gray curves represent 95% confidence interval. $*$ $p < 0.10$, $**$ $p < 0.05$, $***$ $p < 0.01$.

Return

Lecture 1 (Growth Mindset and Fixed Mindset)

- **A fable of two seeds**

  ▷ A short cartoon that uses two seeds as a metaphor for two different mindsets. The primary goal is to illustrate distinct attitudes towards challenges embraced by these two mindsets.

  ▷ A follow-up discussion will be organized, delving into the content and exploring how students would associate these mindsets with their friends and families.

- **Short interview with Prof. Carol Dweck**

  ▷ Prof. Dweck proposes the definition of the growth mindset and the fixed mindset, while also highlighting the advantages of adopting a growth mindset.

  ▷ The instructors then elaborate on how individuals with different mindsets behave (taken from Dweck 2006)).

Lecture 1 (Growth Mindset and Fixed Mindset)

- **Building a growth mindset**

  ▷ The instructors begin by presenting some neuroscience evidences to demonstrate the plasticity of human brain (akin to the design used by Yeager, Hanselman, et al. 2019).

  ▷ To further show the plasticity of the brain, the students are given a case study related to London cab car drivers (Woollett and Maguire 2011).

- **After-class assignment**

  ▷ Students are encouraged to write a short reflective letter[1] to describe what they have learned in Lecture 1. They are also informed that there will be a short discussion session for this assignment in Lecture 2.

Return

[1] The reflective writing is widely adopted in many growth mindset interventions (Paunesku et al. 2015; Outes-Leon et al. 2020)