Online Appendix for Mitigating the Gender Gap in the Willingness to Compete: Evidence from a Randomized Field Experiment

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Curriculum and Class Activities

The grit curriculum consists of a range of topics to be covered in class during weekly project hours. Each week is dedicated to a specific topic, which is introduced by the teacher with the help of a pre-specified set of materials. The material is designed to initiate class discussions and activities, questions and homework. We recommend a minimum of 10 weeks to complete the curriculum. Based on the feedback we received from participating teachers, on average 12 weeks were necessary to complete the curriculum. Most teachers reported that they spent at least 2 hours/week on the project. In the following, we provide a summary of the material to be covered during each week together with the recommended follow-up activities.

Week 1: The Plasticity of the Brain

Growth Mindset Video: The material used for this lesson is a 4-minute video on the concept of the *growth mindset*. The focus of this week's lesson is the plasticity of the brain.

Follow-up Activities: Teachers initiate a class discussion based on questions we provide. Children are then asked to draw themselves while they struggle with an activity that they find very difficult and frustrating. They are asked to imagine their brain activities while they work on the task.

Activity for the Whole Semester: Every week the teacher selects a number of students to be the "students who exerted most effort during this week". The purpose of these announcements is to demonstrate how students make progress by putting in more effort. The announcements are followed by a class discussion on how valuable certain behaviors are. A round of applause is given to the selected students, after which the students' pictures are put on the board into a designated frame, and the students are provided with certificates.

Week 2: Growth Mindset Messages

Growth Mindset Video: Children watch the 4-minute video on the growth mindset one more time. The focus of the lesson is how children differ in their mindsets. The video shows two children who engage in a dialog, one with a growth mindset and one with a fixed mindset.

Follow-up Activities: Teachers initiate a class discussion based on questions we provide. In addition, students are given homework in which they are asked to reflect on their current mindset.

Week 3-4: Failure and Praising

Reading a Letter: Students read a letter, which is written by a student to her parents. The student describes how she has been fascinated by the fact that famous scientists also experience failures on their way to success, and she asks her parents to understand that only because she sometimes fails on a test it doesn't mean that she is lacking the innate ability to perform better. She asks her parents to believe in her and support her when she is trying new things she is not good at from the start.

Follow-up Activity (Week 3): Teachers initiate a class discussion based on questions we provide. The children are then asked to write letters to their parents and teachers in which they explain how they would like to be praised/criticized.

Follow-up Activity (Week 4): Students are asked to form groups and to do research on a famous scientist, artist or athlete of their choice. They are asked to find out about this person's failures and frustrations. The students collect pictures and testimonies which they use to prepare a poster.

Week 5: Goals and Difficult Tasks

A Short Story on Mustafa - How to Deal with Difficult Tasks? In the fifth week, children read a short story about a boy who has been given a homework assignment that is challenging for him. The story describes which strategies the boy uses to tackle the challenging homework task.

Follow-up Activity: Students are asked to write down a goal they themselves want to achieve in one month's time. They are asked to write down the goal on a post-it, and put it on the classroom board together with their name. During the following weeks, students can put a star on the post-it whenever they accomplish something which brings them closer to achieving

their main goal.

Weeks 6-7 : Fear of Failure

A short story on Tugba - Who Likes Failing? Students read and discuss another short story. The story is about a girl who contemplates the meaning of the phrase *'Success consists of going from failure to failure without loss of enthusiasm'.* In the story, the girl asks *'Wise Bird'* for advice. The girl and Wise Bird engage in a conversation which centers around the idea that on the way to success people encounter numerous challenges and inevitably they fail many times before they succeed. The importance of not giving up is emphasized.

Follow-up Activities: In class, the teacher discusses these concepts on the basis of questions we provide and encourages students to think about their goals, what likely challenges they will encounter and how they are going to achieve them. In addition, the students are asked to write a letter to Wise Bird in which they convey which goals they have.

Follow-up Games: In this game, the teacher draws a person on the board and asks students to imagine that this person has a goal (e.g. become a good football player). The teacher then draws a chronological chart, and complements it to include activities the child engages in to achieve this goal and challenges the student needs to overcome.

Homework: Students find out about the dream of their close friend and they create a similar chronological chart for him/her.

Week 8-9: Fear of Mathematics

A Mini-Cartoon Story - Dancing with Numbers: Students are presented with a story about a boy who is afraid of math. In his dreams, there are numbers that want to engage and play with him but he is afraid. The next morning the boy is in school and observes how other children attempt to find solutions to math problems that the teacher poses in class, even if they do not know the right answer from the start. The boy observes how the students get encouraged to praticipate even if they do not know the right answer, which eventually encourages him to participate as well.

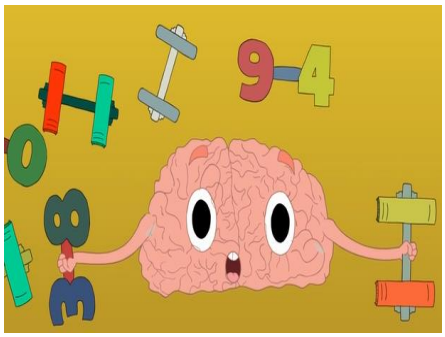
Follow-up Activity: Students are asked to complete the same math problems and raise their hands to give their solutions to the math problems. The teachers initiate a class discussion based on questions we provide.

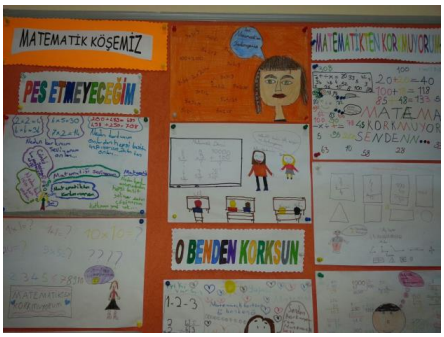
Week 10: Developing a Classroom Culture and Announcing Learned Outcomes

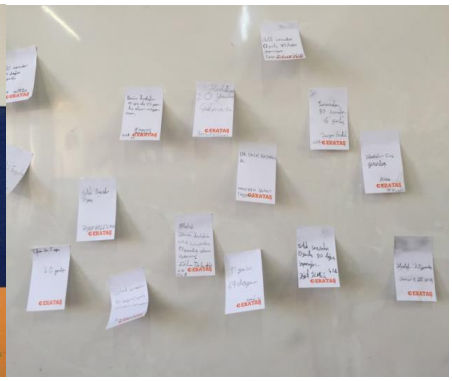
In the tenth week, students engage in a consolidating activity. In particular, students form groups and they prepare a poster which is then displayed on the classroom board. Each group covers a different topic: *1) We dream big. We have plans. 2) We are not afraid of failure. 3) We do not give up. 4) We champion effort. 5) We love difficult tasks.* Within each group, every student is expected to make a different contribution to the poster. Contributions ranged from making a painting, writing a short essay or choosing a slogan for the poster to writing poems or songs. We awarded a large trophy to the top 3 materials produced in class. The selection was made by a committee of volunteer teachers.

Follow-up activity: In all schools in which the project was carried out, the work was exhibited in the schools' corridors. This activity was carried out at the end of the semester, and it served the purpose to also inform the rest of the school about the project.

A Screenshot from Education Materials and Sample Class Activities







The first picture is a screenshot from a video that depicts the brain when it is struggling with difficult math problems. With sustained practice, the brain becomes bigger and stronger. The first and the second posters (made by children) are about quitting and unfounded fear of math, with the second one translating as: "I never quit". The third activity relates to goal-setting, where each student posts their monthly target and updates it during the month.

Supplementary Tables Referred in the Main Paper

Table B.1: Treatment Effects of Patience Treatment on Competitiveness

	Stage 1		Stage 2	
	(1) Girls	(2) Boys	(3) Girls	(4) Boys
Patience	0.058	-0.063	-0.052	-0.063
	(0.07)	(0.10)	(0.04)	(0.10)
Control Mean	0.327	0.404	0.402	0.499
Girls=Boys (P-value)	0.794		0.943	
Observations	657	695	656	695

Note: Coefficient estimates are average marginal effects from logit regressions where the dependent variable is the binary outcome of competition choice. Clustered standard errors (at the school level) are in parentheses, $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$. The average proportions of the control sample (Control Mean), and the p-value for the equality of treatment effects across gender (Girls=Boys (P-Value)) are given at the bottom of the table.

Table B.2: Multiple Hypotheses Testing Adjustments

	Girls		Boys	
Outcome	Original P-Value	Romano-Wolf P-Value	Original P-Value	Romano-Wolf P-Value
Competition Stage 1	0.000	0.000	0.009	0.064
Competition Stage 2	0.000	0.000	0.689	0.984
Payoff Maximizing Choice: S1	0.144	0.144	0.392	0.936
Payoff Maximizing Choice: S2	0.000	0.000	0.697	0.984
Payoff Maximizing Choice: Overall	0.000	0.000	0.877	0.988
Expected Payoff Gains: S1	0.001	0.008	0.155	0.709
Expected Payoff Gains: S2	0.000	0.000	0.992	0.988
Expected Payoff Gains: Overall	0.000	0.000	0.514	0.964
Optimism (Relative P: S1)	0.022	0.092	0.105	0.645
Optimism (Relative P: S2)	0.038	0.099	0.359	0.936
Optimism (Improved P: S2)	0.037	0.099	0.134	0.705
Post-Treatment Grit Score	0.000	0.000	0.001	0.012

Table B.3: Heterogeneous Treatment Effects on Competition Choice: Cognitive Ability

	Stage 1				Stage 2			
	(1) Girls-Low	(2) Girls-High	(3) Boys-Low	(4) Boys-High	(5) Girls-Low	(6) Girls-High	(7) Boys-Low	(8) Boys-High
Treatment	0.147***	0.136***	0.105**	0.076*	0.170***	0.141***	-0.005	0.029
	(0.05)	(0.03)	(0.04)	(0.04)	(0.06)	(0.03)	(0.04)	(0.05)
Control Mean	0.275	0.380	0.377	0.449	0.336	0.438	0.427	0.545
Permutation P-value	0.011	0.002	0.043	0.091	0.005	0.001	0.945	0.592
Observations	493	763	547	765	494	761	545	768

Note: Coefficient estimates are marginal effects from logit regressions where the dependent variable is the binary outcome of tournament choice. Regressions are run conditional on gender and cognitive ability level, where an above-median Raven score is taken as an indicator of "High" cognitive ability, whereas a median or below-median Raven score is taken as an indicator of "Low" cognitive ability. Clustered standard errors (at the school level) are in parentheses, $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$.

Table B.4: Heterogeneous Treatment Effects on Payoff-Maximizing Choices and Expected Payoff Gains

	Payoff Maximizing Choice				Expected Payoff Gains			
	(1) Girls-Low	(2) Girls-High	(3) Boys-Low	(4) Boys-High	(5) Girls-Low	(6) Girls-High	(7) Boys-Low	(8) Boys-High
Treatment	0.080***	0.091**	-0.012	0.018	3.769**	6.891***	-0.109	1.929
	(0.03)	(0.04)	(0.04)	(0.04)	(1.41)	(1.75)	(1.86)	(1.77)
Control Mean	0.279	0.319	0.345	0.387	-1.847	0.809	1.926	6.370
Permutation P-value	0.041	0.029	0.792	0.560	0.027	0.001	0.998	0.245
Observations	492	760	541	763	485	756	527	754

Note: The coefficient estimates in columns 1-4 are marginal effects from logit regressions where the dependent variable a binary outcome which takes the value 1 if the child made payoff-maximizing choices in both stages and zero otherwise. The coefficient estimates in the last four columns are coefficients from OLS regressions where the dependent variable is expected payoff gains. Covariates (not shown) used are risk tolerance, Raven score, gender of the opponent and gender of the teacher. "High" indicates high cognitive ability (above-median Raven score), "Low" indicates low cognitive ability (median and below-median Raven score). Clustered standard errors (at the school level) are in parentheses, $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$.

Table B.5: Detailed Mediation Results: Single Mediator IV

	Optimism (Relative P: S1)		Grit	
	(1) Girls	(2) Boys	(3) Girls	(4) Boys
Optimism (Relative P.) S1	0.305***	0.293***		
	(0.01)	(0.03)		
Grit Score			0.239***	0.227***
			(0.02)	(0.05)
Girls=Boys (P-Value)	0.694		0.668	
Observations	1243	1277	1086	1110

	Optimism (Realtive P: S2)		Optimism (Improved P: S2)		Grit	
	(1) Girls	(2) Boys	(3) Girls	(4) Boys	(5) Girls	(6) Boys
Optimism (Relative P.) S2	0.323***	0.236				
	(0.01)	(0.25)				
Optimism (Improved P: S2)			0.099***	0.040		
			(0.01)	(0.09)		
Grit Score					0.247***	0.084
					(0.02)	(0.15)
Girls=Boys (P-Value)	0.704		0.377		0.160	
Observations	1238	1280	1242	1284	1084	1113

Note: This table has 2 panels. The upper (lower) panel gives Stage 1 (Stage 2) results for girls and boys. The coefficient estimates are from IV probit estimation where the dependent variables are Stage 1 and Stage 2 competition choice, respectively. In the upper panel, Columns 1 and 2: optimism (expected relative performance Stage 1) is instrumented with the treatment indicator (dependent variable is competition choice in Stage 1). Columns 2 and 4: Post-treatment grit score is instrumented with the treatment indicator (dependent variable is competition choice in Stage 1). In the lower panel, Columns 1 and 2: optimism (expected relative performance stage 2) is instrumented with the treatment indicator (dependent variable is competition choice in Stage 2). Columns 3 and 4: optimism (expected performance improvement) is instrumented with the treatment indicator (dependent variable is competition choice in Stage 2). Columns 5 and 6: Post-treatment grit score is instrumented with the treatment indicator (dependent variable is competition choice in Stage 2). Covariates used are: opponent gender, risk tolerance, Raven score, teacher gender and the baseline grit score. Clustered standard errors (at the school level) are in parentheses, $*p < 0.10$, $**p < 0.05$, $***p < 0.01$.

Table B.6: Detailed Mediation Results: Intermediate Mediator (Dippel et al 2017)

	Girls			Boys		
	(1) G–>Y	(2) G–>O	(3) G–>O–>Y	(4) G–>Y	(5) G–>O	(6) G–>O–>Y
Grit Score	0.398***	0.509**	0.009	0.319**	0.710**	-0.007
	(0.10)	(0.23)	(0.02)	(0.15)	(0.34)	(0.03)
Optimism (Relative P.) S1			0.740***			0.429
			(0.28)			(0.26)
Indirect Effect			0.377**			0.305**
SE(Indirect Effect)			(0.170)			(0.104)
Observations	1086	1080	1078	1110	1091	1086

	Girls			Boys		
	(1) G–>Y	(2) G–>O	(3) G–>O–>Y	(4) G–>Y	(5) G–>O	(6) G–>O–>Y
Grit Score	0.428***	0.407*	0.098*	0.084	0.509	0.065**
	(0.11)	(0.24)	(0.05)	(0.16)	(0.36)	(0.03)
Optimism (Improved P.) S2			0.830*			0.063
			(0.43)			(0.29)
Indirect Effect			0.338**			0.032
SE(Indirect Effect)			(0.106)			(0.103)
Observations	1084	1078	1075	1113	1095	1093

	Girls			Boys		
	(1) G–>Y	(2) G–>O	(3) G–>O–>Y	(4) G–>Y	(5) G–>O	(6) G–>O–>Y
Grit Score	0.428***	0.346*	-0.093	0.084	0.282	0.042
	(0.11)	(0.18)	(0.11)	(0.16)	(0.29)	(0.09)
Optimism (Relative P.) S2			1.438*			0.144
			(0.85)			(0.79)
Indirect Effect			0.498			0.041
SE(Indirect Effect)			(0.460)			(1.701)
Observations	1084	1074	1071	1113	1093	1090

Note: This table has 3 panels. The upper panel presents the results from Dippel et al. (2017) mediation analysis for the first stage competition using optimism (relative performance in Stage 1) as an intermediate mediator. The middle and lower panels present the results from Dippel et al. (2017) mediation analysis for the second stage competition. The former uses optimism (improved performance), the latter uses optimism (relative performance) as an intermediate mediator. Clustered standard errors (at the school level) are in parentheses, $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$.