

Recruiting Disadvantaged Students for Free Online Tutoring by University Students in Germany

Silke Anger, Bernhard Christoph, Agata Gałkiewicz,
Shushanik Margaryan, **Malte Sandner**, Thomas Siedler

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Background



- Online tutoring can be effective in improving students' school performance. (Carlana and La Ferrara, 2024; Gortazar et al., 2024)

Open questions:

- Which students can be effectively recruited for online tutoring?
- Do these improvements translate into favorable **medium-term outcomes**, such as smoother **transitions into the labor market**?

Background

Effects on school-to-work transition theoretically ambiguous:

Better grades may not be enough to improve school-to-work transition; focus on other abilities, i.e. socio-emotional skills, may be necessary to improve this process. (Resnjanskij et al., 2024; Oreopoulos et al., 2017)



- The online tutoring is provided by the nonprofit-organization *Lern-Fair*, which was founded by students during the COVID pandemic in 2020.
- Rapid growth driven by media and political attention.



- So far *Lern-Fair* has served 23,000 students.

The *Lern-Fair* Tutoring

One-on-one **online tutoring program** designed for **low-performing secondary school students** (grades 8 to 10) and delivered by **volunteering university students** for free. **volunteers** **German education system**



www.lern-fair.de

German-Wide Randomized Controlled Trial (RCT)

RCT sample representative of German students with at least one poor grade in Math, German, or English on their recent report card and who are open to online tutoring. RCT sample selection

Treatment group:

- At the end of an online survey, students receive an **invitation** to register for cost-free online tutoring. registration
- Matched students receive the same Lern-Fair program as regularly implemented - **No risk that scale up reduces effects**
- Usually tutoring lasts for 3 months with 1-2 meetings a week. tutoring arrangements

Control group:

- No invitation for online tutoring.

Data Collection

timeline

map

distribution

Interviews with students and parents in three waves.

Baseline, February 2022: Randomization balance baseline

- Treatment Group (TG): $n = 421$
- Control Group (CG): $n = 418$

Follow-Up I, October 2022: Short-term effects balance follow-up I

Follow-Up II, November 2023: Medium-term effects balance follow-up II

Take-up and baseline characteristics are balanced in the follow-ups.

Tutoring Take-Up Among the Treated (29%)

	Tutoring Takers	Tutoring Non-takers	Difference	p-value
	(1)	(2)	(3)	(4)
Panel A: Socio-demographic				
Female	0.680	0.593	-0.088*	0.093
Age	17.172	16.933	-0.239*	0.051
Former West Germany	0.826	0.803	-0.024	0.576
Migration Background	0.475	0.288	-0.188***	0.000
Welfare Recipients	0.541	0.348	-0.193***	0.000
Panel B: School-related				
Academic Track	0.598	0.572	-0.026	0.619
Grade	10.213	10.294	0.081	0.472
Other Tutoring	0.123	0.247	0.125***	0.004
Math Grade	-0.237	-0.084	0.153	0.169
German Grade	-0.040	0.086	0.126	0.234
English Grade	-0.011	0.028	0.038	0.726
<i>Number of Observations</i>	122	299		

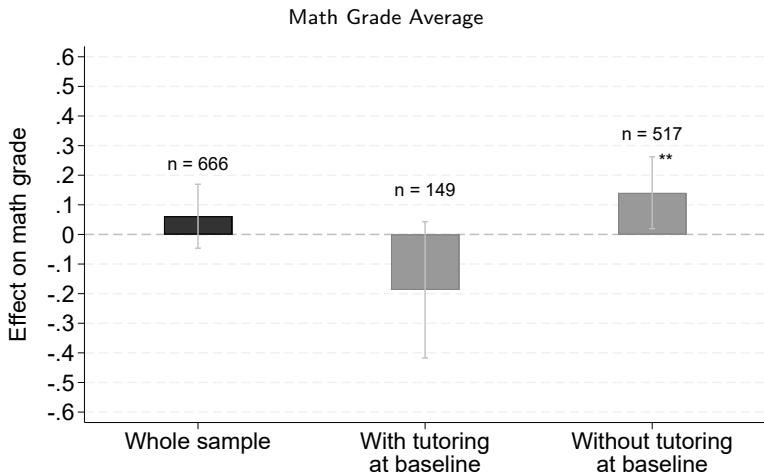
parental encouragement

Evaluating the Effectiveness of Lern-Fair Online Tutoring

Because this is a RCT, we can estimate the effect by directly comparing the mean outcomes of the treatment group (those invited to receive online tutoring) with those of the control group.

Main Outcomes: School grades, grade retention, school-to-work transition

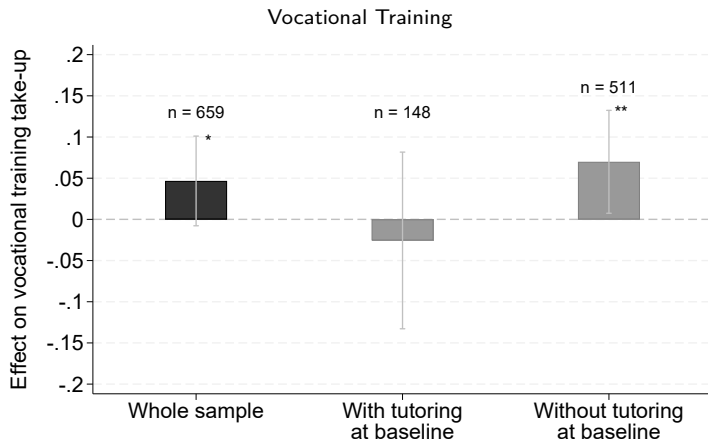
Effects on School Outcomes (Follow-Up I)



grade retention

grade evolution

Effects on School-to-Work Transition (Follow-Up II)



other outcomes

Effects on **School-to-Work Transition** - w/o Tutoring at Baseline

	Vocational Training (1)	Transition Program & Edu (2)
Non-academic Track		
Tutoring effects (unweighted)	0.117* (0.066)	-0.124** (0.062)
Control group mean	0.237	0.376
<i>Number of observations</i>	198	198
Academic Track		
Tutoring effects (unweighted)	0.034 (0.031)	-0.009 (0.026)
Control group mean	0.067	0.055
<i>Number of observations</i>	313	313

Practical Takeaways

One-on-one online tutoring program for low-performing teenagers:

- is attractive for students with migration background and welfare receipt,
- has beneficial effects on **Math grades** and on **vocational training take-up** for non-academic track students,
- more efficient learning is a most likely channel for improved grades and greater success in vocational training applications.

Effects concentrate on students who have no tutoring at the time of randomization.

→ Online tutoring can be a cost-effective and scalable method to have lasting and economically meaningful effects on low-performing teenagers.

Thank you!

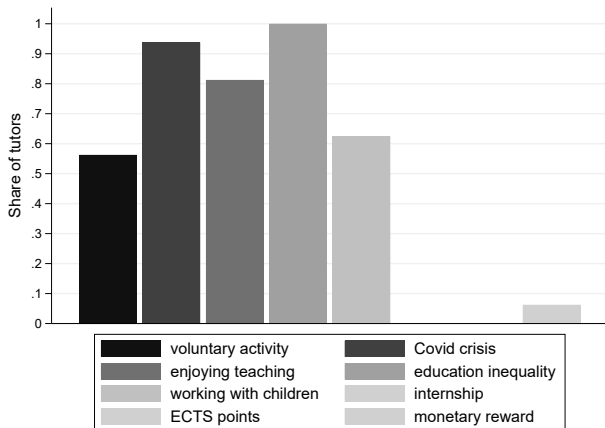
Contact:

Malte Sandner (TH Nürnberg and IAB)

malte.sandner@th-nuernberg.de

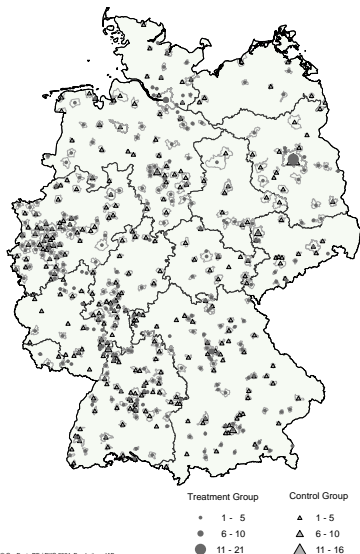
Backup Slides and Appendix

Reasons for Volunteering [back](#)



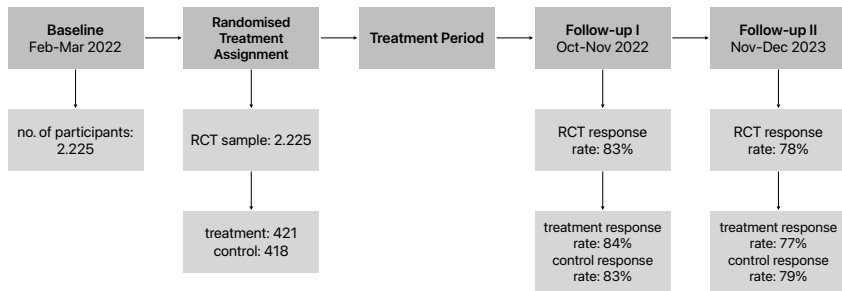
Notes: The figure shows the reasons behind joining Lern-Fair and getting involved in voluntary tutoring activities. More than one reason could be indicated as a valid one. The number of observations equals to 16.

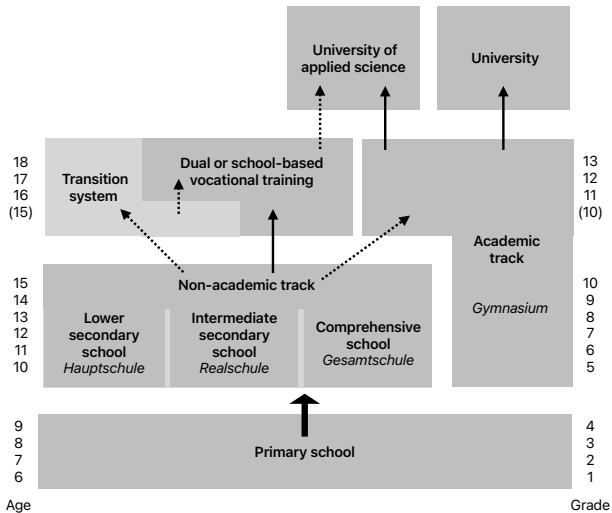
Spatial Distribution of Experimental Households [back](#)



Notes: The figure shows the spatial distribution of experimental households. Households with treated teenagers are marked by circles, while with control teenagers with triangles. The size of a symbol indicates how many households from a given area participate in the experiment.

Experimental Timeline [back](#)





Balance Test - Baseline [back](#)

	Treatment	Control	Mean	
	Mean	Mean	Difference	p-value
	(1)	(2)	(3)	(4)
Panel A: Socio-demographic				
Female	0.618	0.620	0.001	0.965
Age	17.002	16.993	-0.010	0.903
Former West Germany	0.810	0.806	-0.004	0.890
Migration Background	0.342	0.378	0.036	0.279
Welfare Recipients	0.404	0.407	0.003	0.932
Panel B: School-related				
Academic Track	0.580	0.620	0.040	0.237
Grade	10.271	10.325	0.055	0.464
Other Tutoring	0.211	0.213	0.002	0.957
Math Grade	-0.128	0.000	0.128*	0.069
German Grade	0.050	0.000	-0.050	0.471
English Grade	0.017	0.000	-0.017	0.811
<i>Number of Observations</i>	421	418		

parental and household characteristics

	Treatment	Control	Mean	p-value
	Mean	Mean	Difference	
	(1)	(2)	(3)	(4)
Panel A: Socio-demographic				
Female	0.629	0.623	-0.006	0.876
Age	16.966	16.965	-0.001	0.991
Former West Germany	0.800	0.806	0.006	0.847
Migration background	0.313	0.339	0.026	0.456
Welfare recipients	0.372	0.386	0.014	0.710
Panel B: School-related				
Academic Track	0.606	0.643	0.038	0.302
Grade	10.321	10.339	0.018	0.821
Other tutoring	0.223	0.212	-0.011	0.726
Math Grade	-0.080	0.000	0.080	0.297
German Grade	0.096	0.000	-0.096	0.195
English Grade	0.041	0.000	-0.041	0.588
<i>Number of observations</i>	355	345		

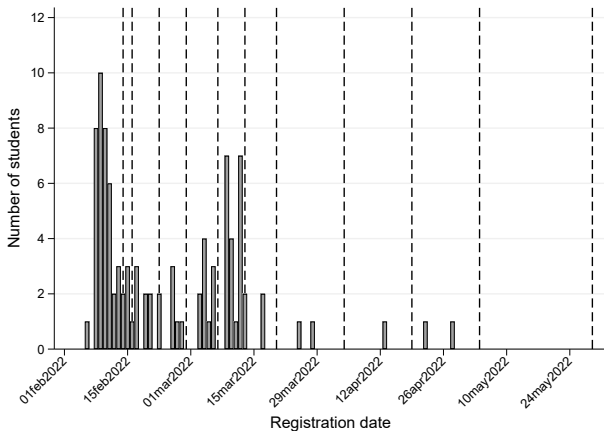
	Treatment	Control	Mean	p-value
	Mean	Mean	Difference	
	(1)	(2)	(3)	(4)
Panel A: Socio-demographic				
Female	0.613	0.630	0.018	0.641
Age	16.978	16.994	0.016	0.858
Former West Germany	0.804	0.812	0.007	0.816
Migration background	0.304	0.342	0.038	0.300
Welfare recipients	0.360	0.364	0.003	0.928
Panel B: School-related				
Academic Track	0.612	0.658	0.046	0.225
Grade	10.314	10.370	0.056	0.503
Other tutoring	0.233	0.218	-0.015	0.653
Math Grade	-0.095	0.000	0.095	0.229
German Grade	0.060	0.000	-0.060	0.437
English Grade	0.047	0.000	-0.047	0.554
<i>Number of observations</i>	322	330		

	Sample Reduction	Sample Size	Share of Initial Sample
Baseline Survey Participants		2,225	100.0%
1. Panel Readiness (agreement to receive invitations to participate in further surveys)	-6	2,219	99.7%
2. Enrolled in General School (being enrolled in general school in school year 2021/2022)	-343	1,876	84.3%
3. Low School Grades (at least one grade from Math, German or English on the certificate obtained in the middle of school year 2021/2022 as bad as 3)	-526	1,350	60.7%
4. Positive Attitude towards Online Tutoring (hypothetical willingness to take part in online, free of charge tutoring provided by the students or agreement with the statement that tutoring can generally help in improving at school)	-491	859	38.6%
5. Survey Completion	-20	839	37.7%
RCT Sample		839	37.3%

Effects on **School Outcomes** - w/o Tutoring at Baseline

	Math Grade Average (1)	Grade Retention (2)
Tutoring effects (unweighted)	0.142** (0.062)	-0.030 (0.023)
Tutoring effects (AIPW)	0.103* (0.059)	-0.024 (0.023)
Control group mean	0	0.086
Number of observations	517	517

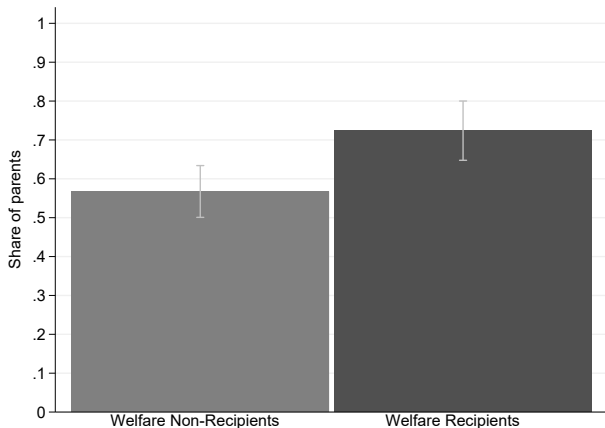
Registration with *Lern-Fair* [back](#)



Notes: The figure shows the time difference between the registration for tutoring on the Lern-Fair website (grey bars) and the assignment to a Lern-Fair tutor (dashed lines).

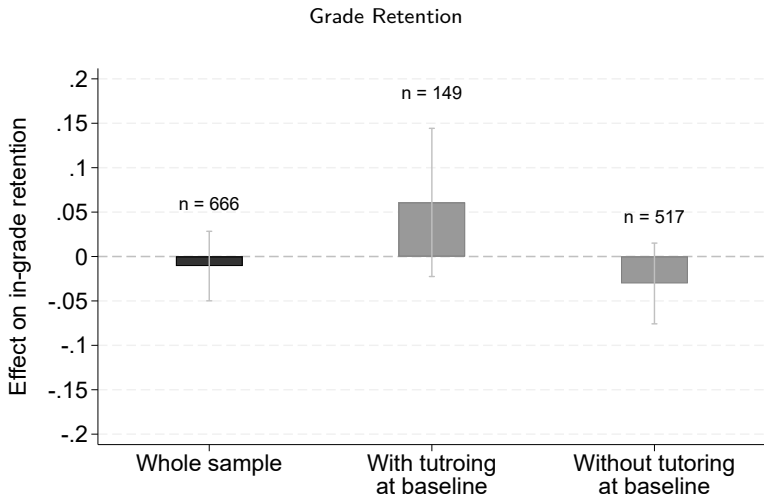
Share of Parents Actively Encouraging Tutoring Take Up by Welfare Status

[back](#)



Notes: The figure shows the share of parents that actively encourage their children to take up tutoring by welfare status. The share of parents that provide such an encouragement among these who receive welfare transfers equals to 72%, while among these who do not receive social help to 57%. The difference is significant at 1% level. The number of observation is 349.

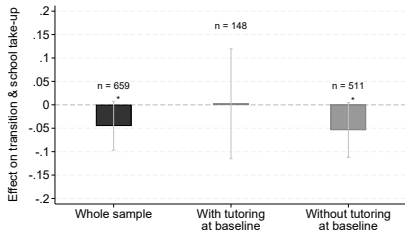
Differential Effect on School Outcomes (Follow-Up I)

[back](#)

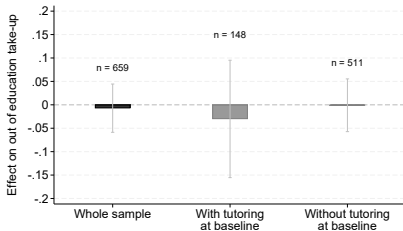
Differential Effects on Career Decisions

(Follow-up II) [back](#)

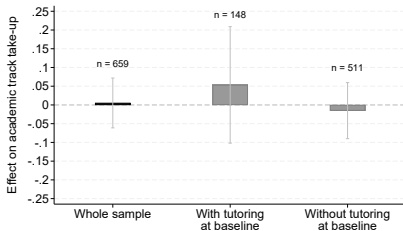
Transition & School



Out of Education



Academic Track



Potential Mechanisms: School Input, Health & Behavior, Aspirations

[back](#)

	School Input		Health & Behavior	
	Studying Time	Class Activity	Mental Well-Being	Grit
	(1)	(2)	(3)	(4)
Tutoring effects (unw.)	-0.057 (0.093)	0.040 (0.184)	-0.012 (0.066)	0.012 (0.069)
Control group mean	1.816	2.921	0	0
Number of observations	374	374	463	463

	Aspirations			
	Non-academic Track		Academic Track	
	Voc. Training	Uni Degree	Voc. Training	Uni Degree
	(1)	(2)	(3)	(4)
Tutoring effects (unw.)	-0.013 (0.071)	-0.021 (0.069)	-0.036 (0.054)	-0.013 (0.036)
Control group mean	0.710	0.754	0.589	0.901
Number of observations	147	147	286	286

Potential Mechanisms: Learning Efficiency [back](#)

	Grade Average	
	English	German
	(1)	(2)
Tutoring effects (unweighted)	0.142** (0.061)	0.010 (0.071)
Tutoring effects (AIPW)	0.117** (0.059)	-0.024 (0.068)
Control group mean	0	0
Number of observations	517	517

Potential Mechanisms: Vocational Training Application Behavior

[back](#)

	Voc. Train. Enrollment (1)	Application Submission (2)	Successful Application (3)
Non-academic Track			
Tutoring effects (unweighted)	0.117* (0.066)	0.013 (0.071)	0.217** (0.102)
Control group mean	0.237	0.391	0.647
Number of observations	198	192	78

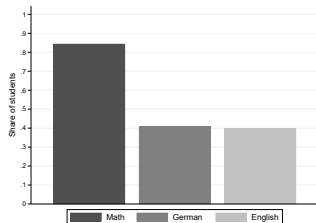
Long-Term Effects of Online Tutoring on School Outcomes

[back](#)

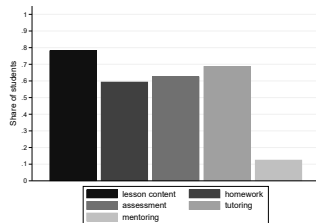
	Math Grade Average	In-grade Retention
	(1)	(2)
Tutoring effects (unweighted)	0.111 (0.105)	-0.031 (0.027)
Control group mean	0	0.087
Number of observations	350	350

Tutoring Arrangements [back](#)

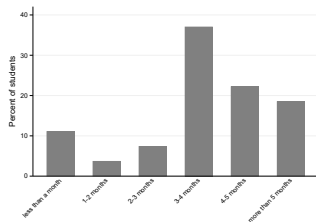
Registration by Subject



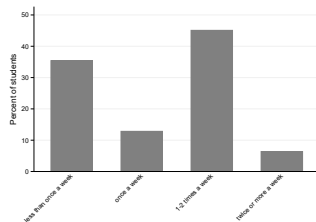
Area of Support



Tutoring Length

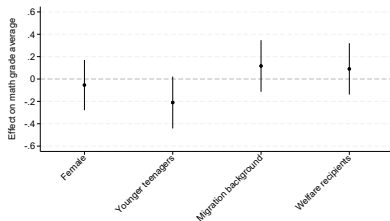


Tutoring Frequency

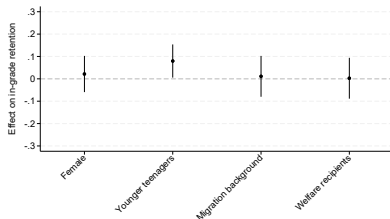


Notes: Top-left figure (N = 83) displays the share of students who expressed the wish to be tutored in a particular subject. Top-right figure (N = 32) displays how Lern-Fair tutors were supporting CoDu students. Bottom-left figure (N = 31) indicates how long and bottom-right figure (N = 27) how often tutoring sessions were taking place.

Math Grade Average

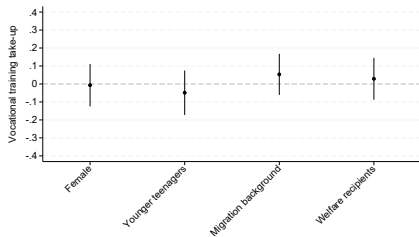


Grade Retention

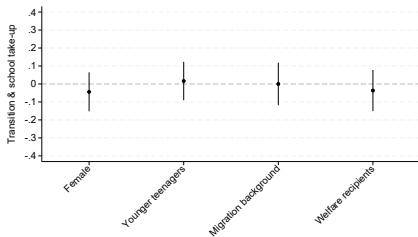


Heterogeneity: Career Decisions - All Students [back](#)

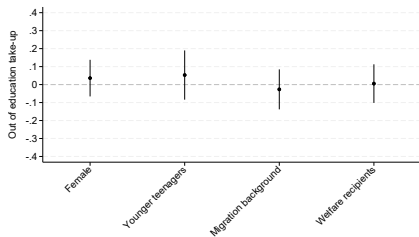
Vocational Training



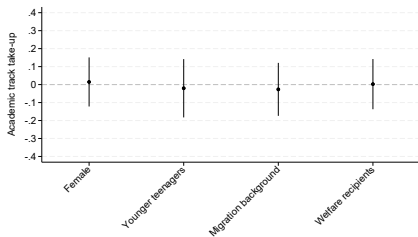
Transition & School



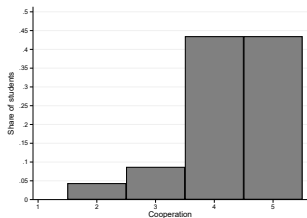
Out of Education



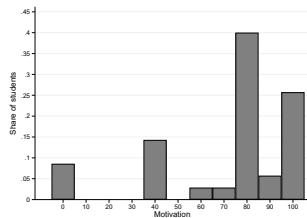
Academic Track



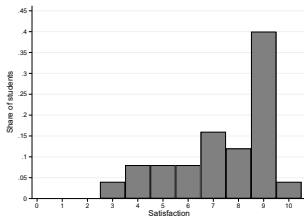
Cooperation Assessment (Tutors)



Motivation Assessment (Tutors)

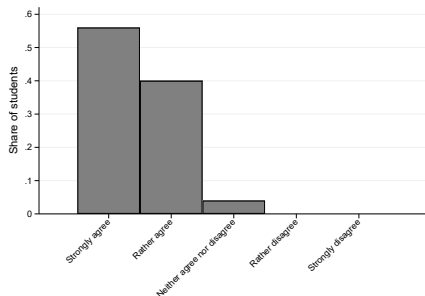


Satisfaction Assessment (Teenagers)

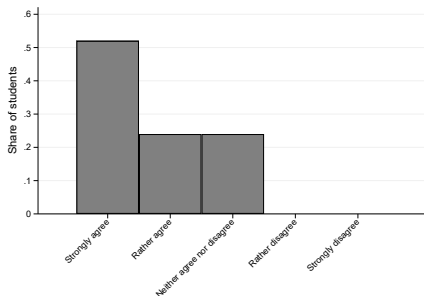


Notes: Top-left figure ($N = 23$) shows how Lern-Fair tutors assessed the cooperation with CoDu students. This question could be answered on the scale 1-5 with 5 being the best score. Top-right figure ($N = 35$) shows how Lern-Fair tutors assessed the motivation of CoDu students. This question could be answered on the scale 0-100 with 10-points intervals and 100 being the best score. Bottom figure ($N = 25$) shows how satisfied CoDu students were with the tutoring provided by Lern-Fair. This question could be answered on the scale 0-10 with 10 being the best score.

Familiarity with the Topic

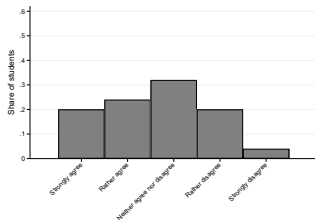


Well-provided Explanations

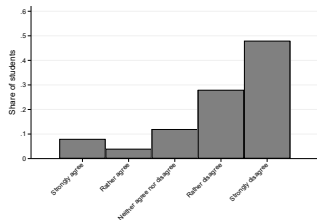


Notes: The figures (N = 25) show the distribution of responses to the statements on the tutoring content. Figure on the left relates to the statement "My learning partner was familiar with the topics in the tutoring subject". Figure on the right refers to the statement "My learning partner was able to explain the tutoring subject to me well". In reaction to all these statements students could express their agreement on the five-point scale ranging from "strongly agree" to "strongly disagree".

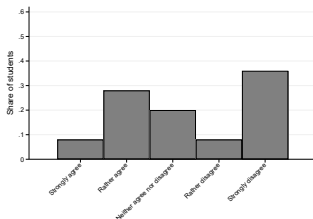
Useful Tips for Learning



Help with Career Decisions



Discussing Personal Topics



Notes: The figures (N = 25) show the distribution of responses to the statements on the tutoring process. Top-left figure relates to the statement "My learning partner was able to give me useful tips that would also help me with other subjects at school". Top-right figure refers to the statement "My learning partner helped me with further plans for school and career choice". Bottom figure relates to the statement "I was also able to talk to my learning partner about personal topics in my current life situation".

Balance Test: Parental and Household Characteristics

[back](#)

	Treatment	Control	Mean	p-value
	Mean	Mean	Difference	
	(1)	(2)	(3)	(4)
Panel A: Parental characteristics				
Female	0.986	0.988	0.002	0.771
Age	46.996	46.754	-0.242	0.548
Migration background	0.238	0.268	0.030	0.311
Disability	0.005	0.005	0.000	0.994
Education				
No degree	0.052	0.050	-0.002	0.895
High school degree	0.297	0.280	-0.017	0.587
Employment				
Currently employed	0.570	0.560	-0.010	0.765
Ever employed	0.831	0.794	-0.037	0.169
Current daily wage	66.037	67.838	1.801	0.632
Social help				
Currently receiving social help	0.114	0.127	0.013	0.570
Ever receiving social help	0.468	0.495	0.027	0.430
Panel B: Household characteristics				
Net monthly income	3491.034	3463.386	-27.648	0.809
BuT package	0.173	0.191	0.018	0.500
Single household	0.166	0.151	-0.016	0.538
Number of children	1.977	2.039	0.062	0.317
Number of individuals	4.057	4.101	0.049	0.626
<i>Number of observations</i>	421	418		

Share of Participants by Federal States [back](#)

	Study Sample	Germany
	(1)	(2)
Baden-Württemberg	14.18	13.37
Bavaria	17.04	15.85
Berlin	4.77	4.45
Brandenburg	3.10	3.05
Bremen	0.95	0.81
Hamburg	1.79	2.24
Hesse	6.91	7.58
Mecklenburg-Western Pomerania	1.55	1.93
Lower Saxony	9.65	9.65
North Rhine-Westphalia	20.26	21.50
Rhineland-Palatinate	6.20	4.93
Saarland	0.36	1.18
Saxony	4.77	4.84
Saxony-Anhalt	2.62	2.59
Schleswig-Holstein	3.34	3.50
Thuringia	2.50	2.52

Attrition rates between treatment and control groups do not significantly differ in any of the survey waves.

	Total	Treatment	Control	p-value
	(1)	(2)	(3)	(4)
Panel A: Baseline				
Number of participants	839	421	418	
Panel B: Follow-up I				
Response Rate	0.834	0.843	0.825	0.487
Number of Participants	700	355	345	
Panel C: Follow-up II				
Response Rate	0.777	0.765	0.790	0.392
Number of Participants	652	322	330	

Attrition also does not depend on any of the interaction terms between treatment and baseline characteristics.

Robustness Check: Definition of Math Grade Average [back](#)

	Points 0-15	Dummies for specific grades			
		"Very good"	"Good" or better	"Satisfactory" or better	"Adequate" or better
		(1)	(2)	(3)	(4)
Tutoring effects (unw.)	0.461** (0.184)	0.030 (0.022)	0.078** (0.034)	0.032 (0.032)	0.013 (0.021)
Tutoring effects (AIPW)	0.345** (0.171)	0.021 (0.022)	0.070** (0.033)	0.028 (0.029)	0.004 (0.022)
Control group mean	8.152	0.070	0.311	0.708	0.922
Number of observations	517	517	517	517	517

Non-academic Track

	Vocational Training (1)	Transition & School (2)	Out of Education (3)	Academic Track (4)
Tutoring effects (AIPW)	0.121* (0.062)	-0.117** (0.065)	-0.052 (0.048)	0.050 (0.061)
Control group mean	0.237	0.376	0.161	0.226
Number of observations	198	198	198	198

Academic Track

	Vocational Training (1)	Transition & School (2)	Out of Education (3)	Academic Track (4)
Tutoring effects (AIPW)	0.032 (0.031)	-0.008 (0.025)	0.034 (0.038)	-0.070 (0.045)
Control group mean	0.067	0.055	0.116	0.762
Number of observations	313	313	313	313

Change in Math Grade Average from Baseline to Follow-up I

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