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Social inequality in the homeschooling efforts of German high school students during a school closing period

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ABSTRACT

School closings have been a key policy measure worldwide for reducing the spread of corona-virus disease (COVID-19). In Germany, federal states closed schools in mid-March and started to reopen them in late April. This policy potentially increased parental obligations for supervision and support during homeschooling and, thus, might reinforce social inequality in educational opportunities. Therefore, this research note investigates social inequality in students' homeschooling efforts. Moreover, it asks whether social disparities in home learning environments, social support, teacher support, and cost-benefit-related considerations account for the social differences in homeschooling efforts during the school closing period in Germany. To that end, we use data from an ongoing research project on high school students in their final years that were collected during the school closing period. Our results show pronounced differences in home schooling efforts by social background. Thus far, the mechanisms under study can explain only a moderate part of the social origin effect. In summary, the results show that school closings have the potential to exacerbate social inequality in educational opportunities. Therefore, future research should scrutinise the extent to which school closings reinforce inequality in educational opportunities.

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KEYWORDS Social origin; home-schooling; COVID-19; BerO

1. Motivation

School closings have been a key policy measure during the ongoing coronavirus disease in 2020 (COVID-19). According to UNESCO, approximately 138 countries have closed schools nationwide, and

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several other countries have implemented regional or local closings, affecting the education of approximately 80% of children worldwide (Van Lancker and Parolin 2020). These rare events in modern societies are likely to amplify inequalities in educational outcomes (Van Lancker and Parolin 2020). At the same time, a public debate over whether home-schooling might increase the socioeconomic differences in educational opportunities arose.

Research on summer learning loss and on summer camps finds pronounced socially stratified achievement gaps that develop over a period without schooling (e.g. Alexander et al 2007). These findings imply that COVID-19-induced school closures have the potential to enforce socioeconomic status (SES) gaps in educational attainment. Additionally, recent projections regarding the impact of COVID-19-related school closings imply that particularly high-performing students could even improve their reading skills during school closures (Kuhfeld et al. 2020). Given the pronounced social background-specific differences in educational achievement and the formation of competencies, this finding has strong implications for social inequality in educational opportunities (Boudon 1974).

This research note contributes to the outlined research and public debate regarding analysing the social differences in the number of hours that students invest in homeschooling activities during COVID-19-induced school closings in Germany. Examining these differences is important, as differences in schooling activities during a school closing period have the potential to exacerbate inequalities in educational opportunities. Furthermore, this research note addresses potential mechanisms that may explain the social differences in learning effort. We analyse the roles of the homeschooling environment, the social support of students, cost–benefit considerations regarding post-secondary education decisions and teacher support during school closure. Analysing the pathways through which inequality unfolds is important for deepening the understanding of the interplay between parental background and children’s learning effort and for informing policymakers about potential fruitful interventions.

Thus far, preliminary insights from Germany, Ireland, and the UK suggest substantial variation in the hours that students spend on homeschooling (e.g. Anger et al. 2020; Andrew et al. 2020; Green 2020; Doyle 2020). Furthermore, these insights indicate that the hours spent on homeschooling are related to students’ SES (e.g. Anders et al. 2020; Andrew et al. 2020; Doyle 2020; Green 2020). For Germany, no study currently exists that considers the SES differences in homeschooling

and that empirically tests potential mechanisms that might account for such differences in homeschooling efforts.

To take a first step towards closing this research gap, we analyse data collected by a large-scale longitudinal student survey in Germany that started in fall 2019 (BerO 2019). The second wave of this survey (N~5,900) started in March 2020. The target group of this survey is students in their final years of high school ('Gymnasium'). Initially, the second-wave questionnaire did not include questions concerning the COVID-19 pandemic. However, researchers at the Institute for Employment Research (IAB) were able to incorporate questions on students' perceptions of school closings from late March onward. This research note uses preliminary data from this COVID-19 sample comprising approximately 1,400 students.

Based on these preliminary data, this research note aims to answer the following questions. First, does investment in the homeschooling activities of students from German Gymnasias differ by SES? Second, which mechanisms explain the SES differences in homeschooling activities? In doing so, this research note shows the potential of school closings for reinforcing social inequality in educational opportunities.

2. Theoretical notions and empirical background

The sudden, unexpected school closings in Germany have pushed high schools to implement online learning and virtual teaching almost overnight. Recent data from the European Commission show that compared to the average for European countries, Germany lags behind in school-related digitalisation at both the primary and upper-secondary levels (European Commission 2019). This situation has led to a reallocation of educational responsibilities to parents, who play an important role in supervising and supporting the homeschooling activities of their children (e.g.; Andrew et al. 2020; Bayrakdar and Guveli 2020). This shift in educational obligations towards families raises the question of the extent to which school closures amplify social origin-based inequalities in educational opportunities.

Based on theoretical considerations and empirical evidence from the literature (Bourdieu 1996), we expect SES-specific differentials in parental support for home learning activities during school closure. A rich body of research shows that familial socialisation processes have a direct impact on children's learning success and educational achievement (e.g. Johnson et al. 2007; Tsai et al. 2017; Bol 2020), and the impact of such

processes depends on parental language proficiency, parental norms and values, or motivation. As these factors differ between social strata, learning effort during school closures should differ between students from different social backgrounds.

In addition to direct parental support, students' learning activities, particularly during school closure, may depend on social capital. While the resources from parents' social networks depend on their social class position (e.g. Pichler and Wallace 2009), SES differences in, e.g. support from relatives and friends might differ. Moreover, in addition to the direct and indirect effects of familial support, studies on the homophily of peer networks suggest that SES differences in such networks could contribute to SES-specific differences in homeschooling efforts (e.g. McPherson *et al.* 2001).

Additionally, the home learning environment itself may be an important factor contributing to SES-specific differences in students learning activities, as resources and housing conditions are clearly associated with SES (e.g. Filandri and Olagnero 2014; Wößmann *et al.* 2020). Thus, SES-specific differences in the availability of a quiet room for performing schoolwork or differences in equipment (i.e. fast internet access or personal computers) might influence homeschooling efforts in times of school closure.

Besides direct parental support and supervision of students' learning activities, domestic endowment of the learning environment or social support for learning intensity (McMullin *et al.* 2020), we expect associations between SES-related cost-benefit assumptions on educational aspirations and students learning intensity in times of homeschooling. In particular, we consider the costs of studying and the importance of job promotions later in life to be relevant factors that structure individuals' learning investments. The literature unambiguously shows that these kinds of cost-benefit considerations influence students' educational decisions to pursue social origin-adequate educational paths (e.g. Breen and Goldthorpe 1997). Thus, individuals with a high SES should have greater incentives compared to those with a low SES to invest in schoolwork during school closures.

In addition to SES-related parental support, teacher support is assumed to be of high importance regarding students' homeschooling efforts. Recent empirical evidence indicates significant differences in schools with respect to digitalisation (European Commission 2019). Furthermore, recent evidence suggests pronounced social segregation in neighbourhoods that influences both the composition of schools and their positive impact on students' educational achievement (Andersson *et al.* 2019). With respect to upper secondary students, we argue that school quality and teacher support might be associated with parental SES.

3. Data, variables and method

This research uses data collected during the school closures in Germany to analyse how students respond to these closings. The analyses rely on a subsample from an ongoing multi-wave survey on educational orientation and decisions (BerO 2019) that started in 2019 in eight German federal states (Bundesländer) at 217 schools with 7,192 students from the upper secondary school track of German high schools (Gymnasium). The first round of the survey took place in fall 2019 as a classroom-based paper-pencil questionnaire. A total of 5,866 first-round participants fully completed the second-round questionnaire (CAWI/CATI) (retention rate = 82%).

The early worldwide occurrence of COVID-19 was not seriously noticed in the public debate in Germany, i.e. at the beginning of the planning and execution period of the second-round questionnaire. Even as the first COVID-19 cases in Germany emerged in January, the public debate was reluctant but intensified from early March onwards, when the number of cases increased dramatically and the first deaths were reported. Against this backdrop, the research team at the IAB introduced an additional COVID-19 module on home learning into the ongoing second round of the survey at the end of March. The preliminary database employed for this research note contains 1,735 students who participated in the second-round questionnaire at the time of the school closure.

As the employed sample does not constitute a random subsample of the original sample population, we ran linear probability models to analyse the selection process into the COVID-19 module. The results suggest that the selection into the module does not work on the SES variable under study. Thus, the subsample is representative of the entire sample in terms of social origin. However, the results reveal a slight selection by sex, grit, health and risk aversion, thereby emphasising the importance to condition all models on these variables (see [table A4](#) in the [appendix](#)).

The main dependent variable is the time dedicated to schoolwork on the day before the interview. We derive this measure from students' answers to the following survey question:

Please think about yesterday: How much time did you dedicate to the following activities? (a) watching television, (b) playing on the computer, (c) other leisure activities (like reading, drawing, or sports), (d) schoolwork, (e) helping siblings with their schoolwork, (f) doing housework, (g) working, (h) sleeping, (i) ringing up or chatting with friends, (j) meeting up with one or two friend(s) in person, and (k) meeting up with more than two friends in person.

Students were instructed to report the hours for only the main activity if they had performed more than one at a time. For the analysis, we use the logarithm of the hours spent on schoolwork. The transformation normalises the distribution; thus, the logarithmic version of the dependent variable is less sensitive to outliers.

The main explanatory variable is an SES measure. We operationalise each student's SES by employing the father's vocational education. Additionally, we tested the father's general education, the mother's general and vocational education and joint measures of parental education. The coefficients of all tested variables indicated the same influence of parental education – with increasing parental education, students invest more in homeschooling. However, our workaround identified the father's vocational education as the most influential (and statistically significant) predictor of SES differences in home learning effort. Moreover, we are aware that in using the father's vocational education, we address only one dimension of social origin. Recent research has confirmed that class position, income position and parental education are distinct social categories (e.g. Mood 2017), and in the case of inequality in homeschooling, recent research already suggests that parental social class and income position are important factors in explaining differences in learning effort (e.g. Andrew et al. 2020; Bayrakdar and Guveli 2020). Based on the father's vocational education, we distinguish three student SES groups: (i) a high-SES group of students having a father with a university degree or a university of applied science degree, (ii) a middle-SES group of students having a father with a vocational training degree (e.g. from the dual apprenticeship system or the school-based training system), and (iii) a low-SES group of students having a father without a university or vocational degree. We include a 'missing information' SES group for approximately 15% of respondents who did not know or did not report the vocational degree of their father.

This research note investigates potential mechanisms explaining the SES differences in hours spent on schoolwork. The first mechanism is the learning environment at home. We operationalize this mechanism with the answers to the following question:

In the following, we want to know more about your learning environment at home since the school closure. To what extent do you agree or disagree with the following statements? (a) I have a quiet room in which I can work without interruptions. (b) I have a laptop, notebook, tablet or personal computer available to perform my schoolwork. (c) I have access to the internet.

Students rated these statements from 1 ‘completely agree’ to 5 ‘I disagree’. For the analysis, we built a ‘poor learning environment at home’ index. We recoded each of the three items with a 1 if respondents did not agree with an item (answer-codes 4 or 5) and a 0 otherwise. The index (i.e. the sum of the recoded items) takes on the value of 0 when students report a good learning environment and the value of 3 when students report a very poor learning environment at home.

The second mechanism is social support. We operationalise social support with the answers to the following question: ‘How often since the school closure have you been receiving learning support from the following persons? (a) parents; (b) classmates/friends’. Students gave answers ranging from 1 ‘on a daily basis’ to 5 ‘never’. We employ these measures as metric variables in the analysis.

The third mechanism is the effort of teachers to send students learning material. As different teachers might use different channels to disseminate learning materials we asked students to rate the intensity of usage for the following channels: (a) online platforms; (b) online courses; (c) digital classrooms/school cloud; (d) emails with instructions; (e) individual teacher feedback; (f) school letters; (g) online teaching (e.g. via Skype or other providers); (h) other channels’. For each channel, students gave responses from 1 ‘several times a day’ to 6 ‘never, not provided’. For the analysis, we built an index ranging from 0 to 7. The value of zero indicates individuals who did not receive learning materials from a teacher on a regular basis whilst the value of 7 indicates students who received learning material over all channels on a daily basis. As in the final grades of German high schools teachers differ for each subject and typically differ in the way they disseminate learning material, we interpret this measure as the intensity of teacher support during the school closure.

The fourth mechanism is cost–benefit considerations. As the cost factor, we consider the answers to the following question: ‘If you would start an academic study after high school, what do you think is the likelihood that the following statement pertains to you? The costs of studying will impose severe financial burdens on me and my family’. Respondents could answer this question on a scale ranging from 1, representing zero percent, to 11, representing 100 percent. As the benefit factor, we consider the answers to the following question: ‘Different aspects can be important work factors and can also be important for the choice of occupation: How important for your occupational choice are career opportunities?’ The answers to this question range from 1 ‘not important at all’ to 5 ‘very important’. We consider both constructs as metric variables.

We employ a set of controls at the individual level: a cohort dummy indicating whether a student is in his pre-graduation year, a gender dummy, dummies for first- and second-generation migrants, and math grades as a crude proxy for individuals' abilities. We assigned controls for self-rated health and personality traits (i.e. locus of control, grit, time preferences and risk aversion) in all models. Additionally, we controlled for the region (Bundesland), the survey week, the day of the week, and two dummy variables indicating whether the survey took place before, during, or after the Easter holidays. To address the teacher support effect, some models also included school dummies.

This research note employs linear regression models (OLS). We first present a base model incorporating the SES indicator and control variables. Then, we run a set of models adding a single mechanism to the base model. The final model is the full model incorporating all mechanisms and control variables.

We applied some sample restrictions to our dataset. We excluded respondents with missing values in the dependent variable (25 cases). We excluded respondents from Berlin, as regional data protection regulations forced us to ask for parental consent to socio-economic background questions, which led to over 50% missing values in the SES information. To avoid contamination of the SES measure, we dropped the 130 cases from Berlin. We dropped 141 individuals due to missing values in the personality trait measures, health measure, and math grade information. School fixed effects omitted six individuals because they were the only respondent from their schools. Based on residual analysis, we excluded 18 extreme outliers from the final model. These sample restrictions reduced the initial sample ($N = 1,735$) to 1,415 observations from seven German federal states (Table A1 in the appendix gives an overview of the sample distribution). Additionally, we performed a series of robustness checks to test the sensitivity of the overall model and the coefficients on holiday respondents or day of the week effects. Those tests confirmed the robustness of our models (tables are available on request).

4. Results

Table 1 presents the results from six OLS models (table A3 in the appendix provides the full results). The base model reported in the first column shows profound SES differences in students' home learning intensity. During school closures, middle-SES students (father with a vocational degree) invest 22% less in homeschooling activities than high-SES

Table 1. Differences in homeschooling by father's vocational education and potential mechanisms

	Base Model	+ Mech. 1	+ Mech. 2	+ Mech. 3	+ Mech. 4	+ Mech. 4 (SFE)	Full Model
Father's Vocational Education (ref. University Degree)							
Vocational Degree	-0.253* (0.132)	-0.257** (0.132)	-0.252* (0.133)	-0.241* (0.133)	-0.238* (0.132)	-0.196 (0.145)	-0.194 (0.147)
No Vocational Degree	-1.256*** (0.465)	-1.261*** (0.463)	-1.180*** (0.460)	-1.243*** (0.454)	-1.198*** (0.466)	-1.215** (0.477)	-1.131** (0.450)
Mechanism 1:							
<i>Poor Learning Environment at Home</i> (Index)		-0.192** (0.082)					-0.207** (0.086)
Mechanism 2:							
<i>Social Support</i>							
Classmates			-0.137*** (0.047)				-0.124** (0.051)
Parents			-0.054 (0.041)				-0.039 (0.044)
Mechanism 3:							
<i>Cost-benefit Considerations</i>							
Financial Burden of Studying				-0.036* (0.021)			-0.042* (0.023)
Importance of Job Promotions				0.129** (0.060)			0.139** (0.062)
Mechanism 4:							
<i>Teacher Support Intensity</i> (Index)					0.153*** (0.036)	0.121** (0.049)	0.102** (0.050)
Controls	✓	✓	✓	✓	✓	✓	✓
State Dummies	✓	✓	✓	✓	✓	✓	✓

(Continued)

Table 1. Continued.

	Base Model	+ Mech. 1	+ Mech. 2	+ Mech. 3	+ Mech. 4	+ Mech. 4 (SFE)	Full Model
Survey Week Dummies	✓	✓	✓	✓	✓	✓	✓
Survey Day Dummies	✓	✓	✓	✓	✓	✓	✓
School FE	-	-	-	-	-	✓	✓
N persons	1415	1415	1415	1415	1415	1415	1415
Adjusted R ²	0.129	0.133	0.137	0.133	0.137	0.151	0.167

Note. OLS regression coefficients (robust standard errors in parentheses). Dependent variable: daily log hours spent on homeschooling. Statistical significance at * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Constant not shown. The (overall nonsignificant) missing category of the social background indicator is not presented here. Controls: gender dummy, dummy for first-generation migrant, dummy for second-generation migrant, math grades, pre-graduation year cohort dummy, locus of control, grit, time preferences, risk aversion, self-rated health, dummy for the Easter holidays, dummy for time after Easter holidays.

Data: BerO-study wave 2.

students (father with a university degree). Low-SES students (father without a vocational degree) invest approximately 72% less in home-schooling activities during the school closure than do high-SES students (gross effects of SES are reported in the [appendix](#), see [table A2](#)).

Column two shows that poor learning environments at home reduce students' learning activity substantially during homeschooling compared to individuals with well-endowed homes. Column three shows that students who receive no support from parents and classmates (the indices range from 1 'daily support' to 5 'never') invest substantially less in homeschooling than individuals who receive daily support. Column four addresses students' cost-benefit assumptions regarding their upcoming educational choice after graduation from high school. The benefit awareness of individuals' educational choices regarding job promotions significantly increases homeschooling activities, while the cost awareness of educational choices tends to decrease homeschooling activities during the closure. The intensity of teacher support (i.e. students obtain learning materials on a regular basis through different channels; column five) increases the respondents' homeschooling activities, even after controlling for school fixed effects (column six). These findings indicate within-school variation in teacher support.

In summary, column seven shows that the mechanisms under study hold even in the full model. The single-mechanism models and the full models significantly increase the share of explained variance. However, the model reduces the SES gap in homeschooling activities only to a limited extent.

5. Conclusions and implications

This research note investigates social inequality in homeschooling efforts and aims to identify the mechanisms explaining the SES gap in the amount that students from different social strata invest in homeschooling activities. The results based on a subsample of a unique student survey (BerO 2019) show pronounced differences by paternal vocational education. Additionally, this research note investigates the influence of four potential mechanisms: (i) learning equipment at home, (ii) social support, (iii) individuals' cost-benefit considerations regarding upcoming educational decisions and (iv) teacher support. The results of the mechanism-based analysis reveal significant independent effects on students learning efforts. However, the mechanisms under study reduce the direct effect of SES on students' homeschooling efforts only to a limited extent.

We are aware that parental education captures only one part of the overall SES effect. After coding parental occupations, we will be able to employ social class as an SES indicator in the next steps of our work. In addition to the parsimonious modelling of social origin, we must consider that temporary homeschooling is embedded in a long-lasting familial socialisation process that had already successfully guided students through approximately 12 years of schooling. Furthermore, that experience might have already stabilised individuals' cost-benefit-related aspirations. Moreover, other factors that we did not include in the survey such as educational norms within families might be important in explaining the SES gap. Furthermore, recent research suggests that assessments of parents regarding whether or not they are capable of helping their children with homeschooling during school closures varies by social origin (Bol 2020). Due to dynamics of the public awareness and political responses to the spread of the corona virus, only a subsample of respondents received the COVID-19 module. Although we found no selection into this model based on social origin, we are aware of possible limitations like selection on unobservables. The presented selection model, however, that included important selection variables like SES, gender, school performance, regional and personality indicators suggests only moderate selection into this module. Thus, we are confident that conclusions drawn from this sample are generalisable and that the employed sample facilitates testing theoretical mechanisms.

The main aim of this research note is to show the potential of school closures to cause inequality in educational opportunities. Of course, it did not employ a causal design (e.g. a difference-in-differences approach). Thus, one fruitful stream of future work could try to employ quasi-experimental methods to evaluate the impact of school closures on learning efforts and elaborate whether this effect varies by social origin. Furthermore, decomposition models (e.g. an Oaxaca-Blinder decomposition) are a possible next step.

In line with our arguments, we assume that the presented COVID-19-related SES differences in the homeschooling effort of German high school students constitute the lower bound of overall SES inequality. As the influence of SES is more pronounced at earlier life-course stages, SES differences in homeschooling efforts for primary or lower-secondary school students should be more pronounced.

In summary, our research note exhibits the potential of school closings for reinforcing social inequality in learning effort. Future work should

investigate the extent to which school closings during the COVID-19 pandemic have led to social inequality in educational opportunities.

Disclosure statement

No potential conflict of interest was reported by the author(s).

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Appendix

Table A1. Variable distribution.

	Mean	Std. Dev.	Min.	Max.
<i>Log. hours for home schooling</i>	-0.063	2.197	-4.605	3.178
<i>Father's Vocational Education</i>				
University Degree	0.582			
Vocational Degree	0.262			
No Vocational Degree	0.024			
Missing Value	0.132			
<i>Poor Learning Environment at Home (Index)</i>	0.370	0.798	0	3
<i>Social Support</i>				
Parents	3.755	1.425	1	5
Classmates	3.067	1.307	1	5
<i>Cost-benefits Considerations</i>				
Financial Burden of Studying	4.540	2.779	1	11
Importance of Promotions on the Job	3.713	0.968	1	5
<i>Teacher Support Intensity (Index)</i>	1.110	1.416	0	7
<i>Cohort</i>				
Graduation cohort	0.430			
Pre-graduation cohort	0.570			
<i>Sex</i>				
Female	0.575			
Male	0.425			
<i>Migration background</i>				
Native	0.764			
First Generation	0.027			
Second Generation	0.173			
Missing Value	0.037			
<i>Math Grade</i>	2.794	1.071	1	5
<i>Locus of Control</i>	3.935	0.550	1.333	5
<i>Time Preferences</i>	2.277	0.725	1	9
<i>GRIT</i>	3.410	0.618	1	5
<i>Risk Aversion</i>	5.817	2.173	0	10
<i>Self-Rated Health</i>	3.901	1.007	1	5
<i>Federal State</i>				
North Rhine-Westphalia	0.246			
Lower Saxony	0.030			
Schleswig-Holstein	0.079			
Saxony	0.025			
Bavaria	0.435			
Baden-Wuerttemberg	0.140			
Hesse	0.045			
<i>Interview Week</i>				
CW 12	0.004			
CW 13	0.486			
CW 14	0.068			
CW 15	0.035			
CW 16	0.074			
CW 17	0.209			
CW 18	0.030			
CW 19	0.054			
CW 20	0.041			
<i>Weekday</i>				
Sunday	0.069			
Monday	0.087			
Tuesday	0.104			
Wednesday	0.118			

(Continued)

Table A1. Continued.

	Mean	Std. Dev.	Min.	Max.
Thursday	0.243			
Friday	0.250			
Saturday	0.129			
<i>Easter Holidays</i>				
No	0.537			
Yes	0.463			
N Persons	1.415			

Data: BerO-study wave 2.

Table A2. Hours for home schooling by father's vocational education.

Father's Vocational Education	Mean	Std. Err.	95% Conf. Interval
University Degree	2.760	0.106	2.551; 2.968
Vocational Degree	2.501	0.144	2.220; 2.783
No Vocational Degree	1.909	0.413	1.099; 2.719

Data: BerO-study wave 2; $n = 1,415$.

Table A3. Full Regression table.

	Base Model	+ Mech. 1	+ Mech. 2	+ Mech. 3	+ Mech. 4	+ Mech. 4 (SFE)	Full Model
<i>Father's Vocational Education</i> (ref. University Degree)							
Vocational Degree	-0.253* (0.132)	-0.257* (0.132)	-0.252* (0.133)	-0.241* (0.133)	-0.238* (0.132)	-0.196 (0.145)	-0.194 (0.147)
No Vocational Degree	-1.256*** (0.468)	-1.261*** (0.463)	-1.180** (0.460)	-1.243*** (0.454)	-1.198** (0.466)	-1.215** (0.477)	-1.131** (0.450)
Missing Value	0.013 (0.166)	0.014 (0.167)	0.018 (0.167)	0.023 (0.166)	0.025 (0.165)	0.019 (0.177)	0.035 (0.179)
Mechanism 1: <i>Poor Learning Environment at Home</i> (Index)							
		-0.192** (0.082)					-0.207** (0.086)
Mechanism 2: <i>Social Support</i>							
Classmates			-0.137*** (0.047)				-0.124** (0.051)
Parents			-0.054 (0.041)				-0.039 (0.044)
Mechanism 3: <i>Cost-benefit Considerations</i>							
Financial Burden of Studying				-0.036* (0.021)			-0.042* (0.023)
Importance of Job Promotions				0.129** (0.060)			0.139** (0.062)
Mechanism 4: <i>Teacher Support Intensity</i> (Index)							
					0.153*** (0.036)	0.121** (0.049)	0.102** (0.050)
School Fixed Effects	-	-	-	-	-	yes	yes
Control Variables							
<i>Migration background</i> (ref. Natives)							
First Generation	0.105 (0.339)	0.193 (0.346)	0.106 (0.351)	0.100 (0.338)	0.079 (0.343)	-0.022 (0.387)	0.107 (0.398)

(Continued)

Table A3. Continued.

	Base Model	+ Mech. 1	+ Mech. 2	+ Mech. 3	+ Mech. 4	+ Mech. 4 (SFE)	Full Model
Second Generation	-0.157 (0.161)	-0.126 (0.162)	-0.101 (0.161)	-0.147 (0.162)	-0.145 (0.161)	-0.111 (0.176)	-0.032 (0.177)
Missing Value	-0.427 (0.342)	-0.378 (0.345)	-0.426 (0.341)	-0.441 (0.338)	-0.470 (0.342)	-0.211 (0.334)	-0.184 (0.328)
Math Grade	-0.158*** (0.056)	-0.147*** (0.056)	-0.156*** (0.056)	-0.164*** (0.056)	-0.161*** (0.056)	-0.191*** (0.060)	-0.179*** (0.059)
Locus of Control	0.003 (0.110)	0.002 (0.109)	-0.003 (0.110)	-0.020 (0.110)	0.006 (0.110)	-0.001 (0.117)	-0.024 (0.115)
Time Preference	-0.040 (0.075)	-0.030 (0.074)	-0.031 (0.074)	-0.072 (0.075)	-0.042 (0.075)	-0.056 (0.083)	-0.066 (0.083)
GRIT	0.491*** (0.105)	0.499*** (0.104)	0.478*** (0.104)	0.461*** (0.105)	0.462*** (0.105)	0.451*** (0.110)	0.408*** (0.109)
Risk Aversion	-0.052** (0.026)	-0.053** (0.026)	-0.052** (0.026)	-0.053** (0.026)	-0.053** (0.026)	-0.057** (0.028)	-0.058** (0.028)
Self-Rated Health	0.142** (0.060)	0.126** (0.060)	0.134** (0.060)	0.131** (0.059)	0.138** (0.059)	0.130** (0.064)	0.090 (0.064)
Federal State (ref. NRW)							
Lower Saxony	-0.269 (0.344)	-0.264 (0.347)	-0.227 (0.337)	-0.234 (0.339)	-0.266 (0.338)	-0.806 (0.974)	-1.005 (0.975)
Schleswig-Holstein	-0.117 (0.263)	-0.102 (0.263)	-0.067 (0.260)	-0.083 (0.263)	-0.095 (0.262)	0.772 (1.184)	0.644 (1.134)
Saxony	0.008 (0.425)	0.020 (0.422)	-0.004 (0.415)	0.059 (0.434)	0.054 (0.421)	-2.320 (1.690)	-2.709 (1.674)
Bavaria	0.253* (0.145)	0.242* (0.145)	0.271* (0.145)	0.267* (0.145)	0.172 (0.147)	-0.311 (0.963)	-0.539 (1.000)
Baden-Wuerttemberg	0.443** (0.175)	0.455*** (0.175)	0.461*** (0.175)	0.476*** (0.174)	0.393** (0.176)	-0.295 (0.937)	-0.410 (0.959)
Hesse	-0.056 (0.306)	-0.012 (0.294)	-0.026 (0.301)	-0.059 (0.304)	-0.068 (0.304)	0.209 (1.115)	0.095 (1.069)

(Continued)

Table A3. Continued.

	Base Model	+ Mech. 1	+ Mech. 2	+ Mech. 3	+ Mech. 4	+ Mech. 4 (SFE)	Full Model
<i>Survey Week</i>							
(ref. CW 13)							
CW 12	0.569 (0.380)	0.557 (0.408)	0.529 (0.425)	0.638* (0.368)	0.540 (0.423)	0.492 (0.560)	0.486 (0.550)
CW 14	-0.227 (0.247)	-0.232 (0.247)	-0.196 (0.246)	-0.248 (0.248)	-0.206 (0.250)	-0.051 (0.262)	-0.050 (0.262)
CW 15	-1.135* (0.625)	-1.103* (0.625)	-1.122* (0.624)	-1.146* (0.620)	-1.183* (0.626)	-1.280* (0.684)	-1.180* (0.685)
CW 16	-0.125 (0.727)	-0.124 (0.725)	-0.167 (0.730)	-0.142 (0.733)	-0.174 (0.726)	-0.252 (0.751)	-0.221 (0.759)
CW 17	0.340 (0.815)	0.338 (0.812)	0.292 (0.819)	0.317 (0.818)	0.275 (0.813)	0.279 (0.830)	0.302 (0.836)
CW 18	0.770 (0.827)	0.737 (0.824)	0.708 (0.828)	0.729 (0.831)	0.721 (0.826)	0.719 (0.854)	0.665 (0.856)
CW 19	1.241 (0.803)	1.194 (0.800)	1.189 (0.806)	1.194 (0.807)	1.183 (0.802)	1.226 (0.816)	1.173 (0.820)
CW 20	0.867 (0.852)	0.865 (0.850)	0.761 (0.854)	0.835 (0.858)	0.819 (0.849)	0.713 (0.873)	0.675 (0.881)
<i>Survey Day</i>							
(ref. Monday)							
Sunday	0.048 (0.346)	0.028 (0.346)	0.048 (0.346)	0.050 (0.345)	0.091 (0.346)	0.026 (0.369)	-0.016 (0.367)
Tuesday	0.797*** (0.282)	0.781*** (0.283)	0.771*** (0.283)	0.765*** (0.282)	0.809*** (0.280)	0.839*** (0.307)	0.768*** (0.309)
Wednesday	0.737** (0.288)	0.728** (0.288)	0.698** (0.289)	0.710** (0.288)	0.771*** (0.286)	0.714** (0.302)	0.650** (0.301)
Thursday	0.753*** (0.258)	0.740*** (0.258)	0.727*** (0.260)	0.738*** (0.259)	0.753*** (0.256)	0.735*** (0.268)	0.677** (0.270)
Friday	0.571** (0.258)	0.562** (0.258)	0.554** (0.261)	0.555** (0.259)	0.580** (0.256)	0.615** (0.266)	0.570** (0.268)
Saturday	0.295 (0.285)	0.292 (0.284)	0.290 (0.285)	0.266 (0.285)	0.309 (0.283)	0.276 (0.299)	0.235 (0.299)

(Continued)

Table A3. Continued.

	Base Model	+ Mech. 1	+ Mech. 2	+ Mech. 3	+ Mech. 4	+ Mech. 4 (SFE)	Full Model
<i>Easter Holidays</i> (ref. before Holidays)							
During Holidays	-0.803 (0.524)	-0.841 (0.526)	-0.758 (0.520)	-0.809 (0.525)	-0.712 (0.526)	-0.533 (0.580)	-0.601 (0.586)
After Holidays	-0.311 (0.802)	-0.318 (0.800)	-0.224 (0.805)	-0.295 (0.806)	-0.245 (0.800)	-0.180 (0.812)	-0.195 (0.816)
Constant	-1.838*** (0.651)	-1.777*** (0.653)	-1.176* (0.674)	-1.800*** (0.674)	-1.819*** (0.649)	-1.539 (1.063)	-0.645 (1.130)
N persons	1415	1415	1415	1415	1415	1415	1415
Adjusted R ²	0.129	0.133	0.137	0.133	0.137	0.151	0.167

Note. OLS regression coefficients (robust standard errors in parentheses). Dependent variable: daily log. hours spent on home schooling. Statistical significance at * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Data: BerO-study wave 2.

Table A4. Sample Selection – Factors associated with participation in COVID-19 module.

	(1)
<i>Father's Vocational Education</i> (ref. University Degree)	
Vocational Degree	-0.011 (0.015)
No Vocational Degree	0.049 (0.042)
Missing Value	-0.011 (0.018)
<i>Dummy for Pre-Graduation Cohort</i>	
	0.005 (0.012)
<i>Dummy for Male Student</i>	
	0.059*** (0.013)
<i>Migration Background</i> (ref. Natives)	
First Generation	0.017 (0.039)
Second Generation	0.001 (0.017)
Missing Value	0.066** (0.029)
<i>Math Grade</i>	
	0.015** (0.006)
<i>Locus of Control</i>	
	-0.006 (0.012)
<i>Time Preference</i>	
	-0.001 (0.008)
<i>GRIT</i>	
	-0.027** (0.011)
<i>Risk Aversion</i>	
	0.007** (0.003)
<i>Self-Rated Health</i>	
	0.045*** (0.006)
<i>Federal State</i> (ref. NRW)	
Lower Saxony	0.093** (0.041)
Schleswig-Holstein	-0.041* (0.024)
Berlin	-0.021 (0.025)
Saxony	-0.018 (0.041)
Bavaria	-0.010 (0.016)
Baden-Wuerttemberg	-0.032 (0.021)
Hesse	0.034 (0.034)
<i>Interview Day Dummies</i> (ref. Monday)	
Sunday	-0.064* (0.038)
Tuesday	-0.255*** (0.030)
Wednesday	-0.257*** (0.029)
Thursday	-0.099*** (0.030)
Friday	0.067**

(Continued)

Table A4. Continued.

	(1)
Saturday	(0.032) -0.019
<i>Constant</i>	(0.034) 0.286***
N persons	(0.067) 5407
Adjusted R ²	0.091

Note. OLS regression coefficients (robust standard errors in parentheses). Dependent variable: Participation in COVID-19 Module. Statistical significance at: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Data: BerO-study wave 2.