Explaining Inequalities of Homeschooling in Germany during the first COVID-19 Lockdown

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Abstract

Current studies suggest that the COVID-19 pandemic is worsening existing social inequalities in the field of education worldwide. We argue that the pandemic is especially challenging for students from socially disadvantaged and educationally deprived homes as parental engagement and resources are hugely important to guide and support the learning process during the school closure period.

To examine how well parents were able to help their children with schoolwork during the homeschooling period in Germany, we used data from the German National Educational Panel Study (NEPS) collected during the first homeschooling period in May/June 2020. Taking known mechanisms of inequality of educational opportunity into account, we explore the effects of parents' aspirations and cultural, social, and economic capital on the ability to help their children.

Our results show that although the majority of parents were able to provide good support with schoolwork, we found the expected inequalities due to social background. Low educated parents are twice as likely to be unable to provide sufficient support compared to highly educated parents. In our multivariate analyses, family resources show a significant positive effect on the likelihood that parents were able to help.

Moreover, regardless of the social or cultural capital endowment of the parents, good technical equipment in the household is associated with a higher probability of support. Thus, ensuring technical home equipment could be a way to promote an educationally supportive learning environment across all social groups.

Keywords

COVID-19, educational inequality, social background, homeschooling, learning environment, Germany

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1. Introduction

Schools in Germany were nationwide closed in mid-March for most of the remaining school year due to the COVID-19 pandemic. With just a few days' notice, teachers, parents, and students were faced with an unprecedented, sudden challenge. While for parents of young children the care burden increased immensely during this time, schools had to continue to fulfil their educational mission and improvise new, digital and analogue learning and teaching concepts at distance. Various studies show that this had fundamentally changed the everyday life of families: Children of elementary school age had on average significantly fewer social contacts outside their core family but spent more time with television, streaming services, or YouTube (Langmeyer et al., 2020, pp. 11-16) while secondary school students were much more likely to use digital learning tools such as educational software than before the pandemic (Wolter et al., 2020). Thus, with the COVID-19 pandemic, the learning environment of students changed significantly. Both teachers and researchers see this as a danger that existing educational inequalities in Germany will worsen (Eickelmann & Drossel, 2020; Huebener, Spieß & Zinn, 2020; Wößmann et al., 2020).

In particular, research findings on the so-called Summer Learning Loss give an idea of how the effect of the loss of educational spaces at school varies according to social background. Studies, especially in the USA, show that children from socially disadvantaged families predominantly regress in their competence development during the summer holidays, while children from socially privileged families remain at their level or even make progress - this happens, for example, through different access to resources such as books (Cooper et al., 1996; Alexander, Entwisle & Olson, 2007; Allington & McGill-Franzen, 2017).

In contrast to regular summer holidays, however, education nominally continued during the pandemic. From mid-May onwards, in most federal states in Germany, selected grades were able to partially return to school. In Bavaria for example, this gradual opening was not completed until mid-June – only a few weeks before the summer break. Including the regular Easter and Whitsun holidays, pupils were in total out of their usual learning environment for up to three months. Students in other European countries found themselves in a similar situation during the first wave. At the time of this writing, the second wave of the pandemic is ongoing and this pattern seems to repeat. Due to more limited opportunities for parents from socio-economically disadvantaged families and more limited access to educational resources (e.g. reading opportunities), the Joint Research Centre of the European Commission predicted an increase in educational inequality for all member states (EU Commission, 2020).

How does this "COVID-19 shock" affect educational inequality in Germany? At this point, the homeschooling situation receives a lot of attention. But studies on the situation at home are still lacking (for an exception see Wolter et al., 2020).

This article aims to explore the heterogeneous learning settings during this forced homeschooling. We focus on social inequality of educational opportunity, i.e. how well parents were able to help their children with schoolwork during the homeschooling period. We argue that the COVID-19 pandemic is especially challenging for students from socially disadvantaged and educationally deprived homes, as parental engagement and resources are hugely important to guide and support the learning process during the school closure period. Furthermore, we argue that socially differential parental support (during the pandemic) can be explained by mechanisms of inequality of educational opportunity known from the sociology of education.

We use data from the Starting Cohort 2 (Kindergarten children, henceforth: SC2) of the German National Educational Panel Study (NEPS).³ In an online supplementary survey, 1,587 parents of approximately 14-year-old pupils were asked in May and June 2020 about their situation during COVID-19 (Weiß, 2020). Not only information on family life during the school closing period is considered in our analyses, but also information on the family from previous waves of this longitudinal study. In addition to the mechanisms of social inequality mentioned above, especially the technical equipment of the household (such as laptops or Wi-Fi) will receive attention.

Since there is currently no broad database for Germany with which to explore the consequences of the pandemic on actual skills development, this article provides further evidence on the extent to which school closures have significant consequences for educational inequality.

³ This paper uses data from the National Educational Panel Study (NEPS): Starting Cohort Kindergarten, doi:10.5157/NEPS:SC2:9.0.0. From 2008 to 2013, NEPS data was collected as part of the Framework Program for the Promotion of Empirical Educational Research funded by the German Federal Ministry of Education and Research (BMBF). As of 2014, NEPS has been carried out by the Leibniz Institute for Educational Trajectories (LifBi) at the University of Bamberg in cooperation with a nationwide network.

2. State of research

2.1 Educational inequalities during the COVID-19 pandemic and the role of resources

Across Europe, several researchers have already focused on the issue of education during the COVID-19 pandemic. Results from Dutch researchers showed that students made very little progress through learning at home during the COVID-19 pandemic and were even partially affected by learning losses - this was especially the case for students whose parents have a low level of education (Engzell et al., 2020). Similar findings could be seen in Belgium, where learning losses were highest in schools with a higher number of socio-economically disadvantaged pupils (Maladonado & De Witte, 2020). Results from the UK Household Longitudinal Study showed that children at risk of poverty received quantitatively more parental support with their schoolwork during the lockdown, but at the same time more often did not have access to a computer at home (20% vs. 7%) which precluded them from taking part in online courses. As a possible explanation for the extended duration of support, the author considered more time of parents due to unemployment (Green, 2020: 10). The issue of parental help with schoolwork has also been addressed based on data from the Dutch LISS panel (Bol, 2020), showing that highly educated parents provided more support with schoolwork and felt more capable to do so. Additionally, they had more school-relevant resources at home, such as computers.

That in particular socially privileged parental homes were able to maintain a conducive learning environment is shown by Jaeger and Blaabaek (2020) from Denmark: They analyzed the borrowing of digital children's books from libraries during the school closure period and found a significantly higher borrowing rate according to higher income and higher education. The authors see this as an indicator of different educational opportunities for pupils and therefore also suspect an increase in educational inequality. Regarding the degree of support from parents during homeschooling, an Austrian study of 250 secondary school students found no considerable difference according to the students' level of competence (Ringeltaube-Stadler, 2020).

Even though there has not yet been a comprehensive analysis of the performance development of pupils in Germany during the school closure phase, there are already structurally large differences compared to the conditions before the pandemic: In general, children in Germany spent less time learning during the school closure phase than during the school period (Wößmann, 2020; Wacker et al., 2020; Grewenig et al., 2020). The reduction in learning time is greater for pupils with lower competencies than for those with higher competencies (Grewenig et al., 2020). Researchers fear that especially low-competence pupils could be severely negatively affected in their educational

development by school closures, as they are on average more likely to live in less favorable conditions at home and parents are less able to support them with their schoolwork (Huebener & Schmitz, 2020).

An increase in social inequality can also be expected for Germany, considering that even before the pandemic, socially privileged parents were able to better support their children with their homework (Anger & Plünnecke, 2020). Studies show that the amount of time parents spend helping with schoolwork does not differ according to social background (Luplow & Smidt, 2019; Lee & Bowen, 2006), but the quality of this help does (O'Sullivan et al., 2014; Dumont, 2012).

2.2 Summer Learning Loss Research and Holiday Effects in Germany

School closures and homeschooling have led to a radical change in the learning environment of students. The setting has become much more heterogeneous and its structuring depends more than ever on the parental home. Findings from the research on the Summer Learning Loss show the effect of longer, heterogenized learning and living environments on socially differential competence development of pupils. US studies in particular revealed that summer holidays can influence the competence development of pupils. Although previous findings are not entirely consistent, as there are also studies for the USA that were able to demonstrate inconsistent or no effects of summer holidays on competence development (e.g. Hippel & Hamrock, 2019), many studies find empirical evidence - especially differences in competence development according to socio-economic status. These studies demonstrate that socially disadvantaged students have less positive competence developments than socially privileged students (Downey et al., 2004; Entwisle & Alexander, 1992; Alexander, Entwisle, & Olson, 2007; Quinn et al, 2016).

To investigate this social disparity, the "faucet theory" by Entwisle, Alexander, and Olson (2000) is relevant, which explains the social differences in competence development by the different access to resources such as books and the socially divergent learning environments. This theory is supported by recent findings such as those of Allington and McGill-Franzen (2017) from the UK, who found far more limited access to books during the summer holidays for children from lower-income families than for socially privileged pupils.

So far, for Germany, the limited studies on Summer Learning Loss do not reveal a clear picture. On the one hand, some studies found a loss of competence over the holidays, but no socially divergent differences (e.g. Coelen & Siewert, 2008a; Coelen & Siewert, 2008b). Other studies show differences according to socio-economic characteristics (Siewert & Coelen, 2020; Siewert, 2013). These inconclusive results are associated with the comparatively short duration of holidays in Germany

(Coelen & Siewert, 2008: 339f.). In the USA, the summer holidays are about four weeks longer. Results for other European countries appear similarly heterogeneous, for example Austrian researchers find differences in competence development according to social status (Jauch, 2018; Paechter et al., 2015); while Lindahl (2001) could not prove this for Sweden. While Sweden has about the same length of summer holidays as Germany, the holidays in Austria are 2-3 weeks longer.

Using Summer Learning Loss as a starting point, an US research team designed predictive models for the development of skills during school closures in the context of the COVID-19 pandemic. However, the researchers did not take homeschooling and teacher support into account and only assume a longer school closure period instead (Kuhfeld et al., 2020: p. 23). Even though important factors are therefore not included, the results indicate the immense potential consequences. The researchers assume that annual learning gains in reading and especially mathematics skills will be significantly lower than in previous years (ibid.: 23). The models also suggest that the spectrum of skills is likely to widen and heterogenize - because even over the 'typical' summer holidays, the highest-performing 30% of students improve their reading skills, while a share of the students declines immensely in reading (ibid.: 23).

So, on the one hand, there is the phenomenon of a decline in competence during the summer holidays, which is, however, little researched in Germany. On the other hand, an extraordinary situation is currently taking place that is likely to increase educational inequalities, but little is known about its actual consequences so far. This work addresses this research gap.

3. Theoretical framework and hypotheses

Social inequality of educational opportunity stems from different chances to succeed in any given educational situation (primary effect of social origin) and different educational choices, especially at transitions in the educational system (secondary effect of social origin) (Boudon, 1974).

The students, who otherwise spend a considerable part of their everyday life in the institution of school and whose learning settings are thus up to a point similar, were exposed to much more heterogeneous learning environments during the school closures. They spent much more time in the family, which allowed primary origin effects to have a stronger impact. According to the sociological literature on the inequality of educational opportunity, several mechanisms can be expected to impact parental support during homeschooling:

Educational aspirations: Parents who have high educational aspirations for their children are more inclined to invest in supporting their children regularly (Haller, 1968; Ditton & Krüsken, 2010; Paulus & Blossfeld, 2007). Parents with a high social status have higher aspirations for their children due to the motive of status maintenance (Breen & Goldthorpe, 1997). Thus, *ceteris paribus*, it can be assumed that high status parents are more prone to invest more in supporting homeschooling.

Cultural capital: Based on the assumption that socially less privileged parents have less educationally relevant capital (Bourdieu, 1986), it can be assumed that these parents will be less able to support their children with their schoolwork and with the special challenges of homeschooling, e.g. being able to explain the educational content or to provide support with technical equipment (hard- and software side), specialist knowledge on learning strategies, how to structure learning environment and learning time, or how to use the provided learning resources most effectively.

Social capital: Social and social norms also play a role (Coleman, 1988) as, depending on the type and quality of the relationship, learning groups may be formed or the parents may adapt their actions to an environment that is conducive or even obstructive to education. Parents with more social capital can get necessary information from other parents or teachers or can arrange for private (paid or unpaid) tutoring.

Economic capital: Usually educational success is not very dependent on economic resources in Germany as even higher education is virtually free. However, as homeschooling is mainly happening via online learning platforms and tools, the amount of connected devices that are suitable for remote learning (mainly PCs or tablets) becomes important. Since schooling before the pandemic was virtually completely analog, parents of poorer families who had not enough hardware like computers for all household members or with less money to spend on new ones, had a more difficult position. Furthermore, poorer families live in smaller apartments providing less space for all members to remotely learn and work.

Additional to these mechanisms of social inequality of educational opportunity, there is another important factor to consider: **Parental working conditions**. Parents with a higher social status often have occupations (e.g. classical white-collar jobs) that allow them to work from home or work flexible hours and are more able to help their children during homeschooling while lower status jobs (e.g. manual labour) cannot as easily be reconciled with helping their children. To understand the effects of social origin on parental support, parental working conditions have to be controlled for.⁴

⁴ Interdependencies between the mechanisms are theoretically implied and known from the literature, but not essential in this context.

Taking these arguments together, we propose the following model to explain differential parental support during homeschooling (see Figure 1).

Figure 1. Mechanisms of social inequality of parental support during homeschooling

Own illustration.

Based on this theoretical model as well as findings from previous research, we can derive the following hypotheses:

1. Parental support during homeschooling is dependent on the social origin of the family, i.e. parents with a higher social status could provide more help during the pandemic.
2. The effect of social origin on parental support is mediated by educational relevant capital endowment, educational aspirations, conditional on parental working conditions.

4. Data and Methods

4.1 Data

To test our hypotheses, the empirical analyses are based on data from the German National Education Panel Study (NEPS) (Blossfeld et al., 2011). The NEPS has been collecting longitudinal individual panel data in a multi-cohort-sequence design since 2008 with a focus on education and learning environments, performance, and sociodemographic background of the family. For the present study, Starting Cohort 2 (Kindergarten; SC2) was used (data version 9-0-0) (Skopek et al., 2012). The original target population for the SC2 were all children around age four attending a kindergarten in 2010/11. Up to 2020, eleven yearly surveys were conducted with children and their parents. Furthermore, an additional NEPS survey was conducted in May and June 2020 during the first wave of the COVID-19 pandemic. This addendum contained relevant information about the situation during the time of crisis and how the living and learning situation has changed for pupils and their parents. This survey was carried out online (CAWI) from May 13 2020 to June 22 2020 (Weiß 2020). This means the items were gathered directly after the peak of the COVID-19 incidence rate, marking the most critical phase of the first wave of the epidemic in Germany and COVID-19. At this time, all schools and other educational institutions were closed. It must be acknowledged that this extra survey generated a lower response rate than usual waves (realization rate 27.3 %) which can be attributed to the online and self-administered form of the study (no interviewer present), the unexpected date (unplanned extra-survey), the special pandemic situation) and the much lower survey time (less than six weeks to participate in the study).

4.2 Operationalization

The **central dependent variable** of all models is whether the parents were able to help their child with the schoolwork during the COVID-19 lockdown (“I was not able to help my child with the schoolwork”). The answer was measured on a five-point Likert-scale from 1 “does not apply at all” to 5 “does fully apply”. For a more intuitive interpretation of the results, we reversed the scale so higher numerical values describe a higher propensity to be able to help the child with the schoolwork.

The **social origin** of the family is measured using the International Socio-Economic Index of Occupational Status (ISEI) score (taken from the parent with the higher score, if both are available) as a continuous variable. The ISEI incorporates the occupational prestige of a person and therefore includes aspects like income, educational level, and social position. For a more convenient

interpretation in multivariate analyses, we z-standardized this variable so effects can be expressed in standard deviations from the mean.

Next, we introduce the hypothesized mediating variables. To measure **cultural capital** we used the overall **number of books** in the household, measured in three categories (0- 100, 101 to 200, more than 200) and the parental **educational background**. We categorised the information about the highest educational certificate of the parents into three groups (no degree, lower degree, or intermediate degree (max. Mittlere Reife), higher education eligibility (Abitur), or any tertiary degree). We see this variable not only as an indicator and mediator of parents' knowledge and skills but also as one of educational orientation.

The overall **social capital** of the parents is measured using a positional generator indicating whether parents know friends or acquaintances with certain occupations (for example, lawyers, medical doctors, teachers, or nurses; see Schulz et al., 2017). From this information, a z-standardized scale is constructed with a mean of zero indicating an average social capital.

As an indicator for **economic capital** we use the overall satisfaction with the technical **equipment at home** that is required for learning, like having access to a quiet place to study, a computer, or other materials. Parents rated the sufficiency of the equipment on a four-point Likert-scale.

The final theoretically motivated mediator is whether parents have high idealistic **educational aspirations** for their child, i.e. that they aspire to higher education entrance qualification (Abitur) or not.

To account for potential spurious correlations, we defined a set of **control variables**. As presented above in figure 1, **Parental working conditions** are an important factor and therefore considered in the following categories: whether the parents work from home, partly from home, or not from home at all (during the lockdown).

Further control variables are the age of the child in 2020 (measured in years), the gender of the child, whether there is any migration background of the child or not, the type of track currently attended by the child (academic track (*Gymnasium*), comprehensive school (*Gesamtschule*), any other track (*Grundschule / Hauptschule / Realschule*), whether the family lives in West or East Germany (including Berlin) and whether the parents are living together or not, the monitoring of the parents, the time the child studies for school, the time the parents support the child, the motivation of the child and the place the responding parent works from during the crisis. Previous parental support is measured with an item from 2015/16 that indicates the overall support parents have for their children regarding the homework ("How often do you support your child with the homework") with answers given on a five-point scale ("never" to "always"). In addition, we use a second item that measures the hours parents

help their child working on school-related aspects per week during the lockdown. Overall motivation is measured by the time the child spends working for school (hours per week during lockdown) and with a second item that measures how difficult it is to motivate the child during lockdown to work for school at home (five-point Likert-scale).

4.3 Methods

We used a nested and step-wise model building to both test the significance of the added variables and to see whether this reduces the effect of our central independent variable, the social origin, which hints at a mediation process. In total, we utilized eight nested models to which we added new variables in blocks. The dependent variable was always whether parents could help their child during lockdown with schoolwork. The design is as follows:

First, the empty model (baseline) only includes the measure of social origin, which is the ISEI of the parents as a continuous variable. The **second** model adds all sociodemographic control variables. The **following** models add the theorized mediators. Finally, a complete model was computed, including all variables and mediators simultaneously.

We ran linear (OLS) regression models in this stepwise fashion. However, to test the robustness of our findings, we did multiple robustness checks. First, since the dependent variable is originally scaled on a five-point Likert scale, we ran ordinal logistic models. Second, we computed results for sub-samples of all children depending on their academic performance. For this, we used the competence tests of the NEPS which measure the performance of the child in both mathematics and German. We divided the sample at the median to form two groups (low and high performers) to see whether results differed by competence level of the children in addition to a model which included all children independent of performance. We compared results for both mathematics and German but found no substantial differences.⁵

All analyses were computed in Stata 16.1. To account for missing information due to nonresponse, we imputed the data multiply (MICE) and use $m = 100$ imputations. We also imputed the dependent variable and included all observations since various auxiliary variables and weights were included to control for selection and sampling design (Sullivan et al., 2015). Using only the non-imputed sample we find comparative results that do not lead to different conclusions. Only respondents were included in the following analyses that participated in the last regular survey wave nine. By doing so we ensure that information is available on all relevant background variables, like SES, for the large majority of all

⁵ Complete tables and do-files are available upon request.

participants. Hence, we regard wave nine as the anchor that serves as a baseline for imputing the critical COVID-19 information, where much less information is available.

Table 1 gives a descriptive overview of all variables. For a better understanding of the relationship with social status, we also provide a comparison between two extreme groups (low social status VS high social status) in the appendix (see Table A1)

Table 1. Descriptive statistics of the complete sample

	Mean	SD	Min	Max	Share imputed
Being able to help with homework	3.72	1.14	1.0	5.0	0.60
Parental ISEI	60.67	14.81	16.0	90.0	0.01
Parental education					
Low education	0.28	0.45	0.0	1.0	0.00
Higher education eligibility	0.23	0.42	0.0	1.0	0.00
Tertiary education	0.49	0.50	0.0	1.0	0.00
Migration background	0.23	0.42	0.0	1.0	0.00
Eastern Germany	0.14	0.35	0.0	1.0	0.23
Single parent	0.17	0.38	0.0	1.0	0.14
Parental support with homework in 2015/16	3.24	1.11	1.0	5.0	0.18
Time child spends with learning	15.75	9.00	0.0	123.3	0.60
Time parents support the child	5.17	6.07	0.0	132.3	0.60
Difficult to motivate child at home	3.03	1.31	1.0	5.0	0.60
Working situation					
Home Office	0.34	0.47	0.0	1.0	0.68
Not at home	0.52	0.50	0.0	1.0	0.68
Partly home	0.14	0.34	0.0	1.0	0.68
Number of books					
0-100 books	0.28	0.45	0.0	1.0	0.13
101-200 books	0.22	0.41	0.0	1.0	0.13
More than 200 books	0.50	0.50	0.0	1.0	0.13
Social capital STD	0.02	0.98	-4.7	3.8	0.13
Technical Equipment	3.53	0.73	1.0	4.0	0.60
High parental aspirations	0.79	0.41	0.0	1.0	0.23
Female pupil	0.51	0.50	0.0	1.0	0.00
School track of pupil					
Lower school	0.17	0.38	0.0	1.0	0.12
Comprehensive school	0.20	0.40	0.0	1.0	0.12
Higher secondary school	0.62	0.48	0.0	1.0	0.12
Age of pupil in 2020	14.16	0.35	12.6	15.7	0.00

Data: NEPS SC2 ([doi:10.5157/NEPS:SC2:9.0.0](https://doi.org/10.5157/NEPS:SC2:9.0.0)). Own Illustration, imputed data m= 100.

5. Results

Figure 2: Ability to help by SES of the family (ISEI)

Data: NEPS SC2 ([doi:10.5157/NEPS:SC2:9.0.0](https://doi.org/10.5157/NEPS:SC2:9.0.0)). Own Illustration, imputed data $m = 100$. Higher numerical values on the x-axis indicate a higher propensity to being able to help the child with the schoolwork. The white lines inside the box plots indicate the group median.

On average, parents were overall able to support their children relatively well (arithmetic mean: 3.72). To test Hypothesis 1, we start by looking at the bivariate relation between our outcome variable (being able to help) and the social status of the family. As depicted in Figure 2, we found the theorized relationship as parents with higher values on ISEI were more able to help (higher numerical value on the x-axis) have.

Next, Table 2 shows the results from the multivariate analysis. We start with the baseline model (M1) that only includes the parental ISEI, continue by adding all control variables in the next model (M2), and then proceed by testing each mediator individually (M3-M7) and complete the analyses with the saturated model including all mediators (M8).

Table 2: Parental support during homeschooling

Model	M1	M2	M3	M4	M5	M6	M7	M8
	Baseline	Controls added	High aspirations	Technical Equipment	Social Capital	Books	Parental education	All mediators
Parental ISEI (Std.)	0.136*** (0.037)	0.115** (0.037)	0.107** (0.038)	0.105** (0.037)	0.093* (0.038)	0.061 (0.038)	-0.046 (0.042)	-0.076# (0.043)
Age of child in 2020		-0.166* (0.084)	-0.157# (0.083)	-0.162# (0.083)	-0.156# (0.083)	-0.151# (0.083)	-0.117 (0.083)	-0.107 (0.081)
Female		-0.220*** (0.062)	-0.222*** (0.062)	-0.195** (0.061)	-0.211*** (0.062)	-0.200** (0.062)	-0.208*** (0.060)	-0.169** (0.059)
Migrant background		-0.098 (0.083)	-0.109 (0.083)	-0.100 (0.083)	-0.078 (0.083)	-0.046 (0.081)	-0.071 (0.082)	-0.032 (0.081)
Type of school								
Lower secondary		Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
Comprehensive school		0.018 (0.100)	-0.014 (0.104)	-0.009 (0.100)	0.018 (0.101)	0.018 (0.100)	-0.010 (0.100)	-0.029 (0.102)
Upper secondary		-0.135 (0.094)	-0.207# (0.108)	-0.165# (0.093)	-0.146 (0.094)	-0.164# (0.095)	-0.214* (0.094)	-0.246* (0.105)
Living in eastern Germany		-0.027 (0.088)	-0.026 (0.088)	-0.029 (0.087)	-0.006 (0.086)	-0.028 (0.088)	-0.028 (0.087)	-0.021 (0.085)
Single parent		-0.225** (0.083)	-0.228** (0.084)	-0.195* (0.082)	-0.208* (0.084)	-0.213* (0.083)	-0.214** (0.082)	-0.169* (0.081)
Parental support with schoolwork in 2015/16		0.055# (0.028)	0.057* (0.029)	0.049# (0.028)	0.056# (0.028)	0.061* (0.028)	0.069* (0.028)	0.064* (0.028)
Time child spends with learning		-0.001 (0.004)	-0.001 (0.004)	-0.001 (0.004)	-0.001 (0.004)	-0.002 (0.004)	-0.001 (0.004)	-0.002 (0.004)
Time parents support the child		0.025*** (0.007)	0.024*** (0.007)	0.028*** (0.007)	0.026*** (0.007)	0.028*** (0.007)	0.026*** (0.007)	0.031*** (0.006)
Difficult to motivate child at home		-0.226*** (0.027)	-0.224*** (0.027)	-0.212*** (0.027)	-0.219*** (0.027)	-0.220*** (0.028)	-0.222*** (0.027)	-0.201*** (0.027)
Parents working								

situation								
From home		Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
Not at home		-0.291***	-0.289***	-0.289***	-0.279***	-0.256***	-0.178*	-0.164*
		(0.074)	(0.073)	(0.073)	(0.073)	(0.074)	(0.075)	(0.074)
Partly home		-0.180	-0.171	-0.203#	-0.168	-0.140	-0.149	-0.144
		(0.111)	(0.112)	(0.113)	(0.110)	(0.112)	(0.110)	(0.111)
High parental aspirations			0.138					-0.019
			(0.100)					(0.100)
Sufficient technical equipment				0.203***				0.202***
				(0.048)				(0.047)
Social capital Std.					0.103**			0.053
					(0.036)			(0.035)
Books at home								
0 to 100						Ref.		Ref.
101 to 200						0.189*		0.088
						(0.094)		(0.096)
201+						0.418***		0.266**
						(0.089)		(0.091)
Higher education eligibility							0.435***	0.371***
							(0.091)	(0.093)
Tertiary degree							0.730***	0.617***
							(0.094)	(0.097)
Constant	3.720***	6.899***	6.708***	6.104***	6.707***	6.370***	5.666***	4.654***
	(0.037)	(1.197)	(1.192)	(1.200)	(1.183)	(1.186)	(1.197)	(1.186)

Data: NEPS SC2, (DOI [doi:10.5157/NEPS:SC2:9.0.0](https://doi.org/10.5157/NEPS:SC2:9.0.0)); n= 3,714. Unstandardized linear regression coefficients; standard errors in parentheses.

$p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

In M1, we found that ISEI exerts a statistically positive influence, meaning that the ability to help increases by 0.123 points when ISEI increases by one standard deviation. This result supports our first hypothesis about the positive relationship between social status and parental support during homeschooling.

When adding all controls in M2, the effect of ISEI only slightly weakened. High parental aspirations did not have an independent effect on the ability to help (M3), while technical equipment does (M4). The same holds for all other mediators tested afterwards. The smaller the effect of ISEI becomes, the stronger the mediating pathway. When looking at this metric, especially the number of books and the parental education level were strong mediators since the effect of ISEI was almost reduced to zero

when including them (M6 and M7). When testing all mediators simultaneously, we found that the effect of ISEI was very close to zero and not statistically significant as well. Since multiple mediators did have statistically significant effects we can conclude that they work partly independent of each other. We observe that the effect of working conditions decreased when the mediators were taken into account but remained significant. This suggests that, as hypothesised, the place of work does depend on social status, but in addition to this, it has an independent contribution to the explanation of parental help with schoolwork. Therefore, we can accept our second hypothesis on the mechanisms of social inequality.

6. Discussion

During the COVID-19 lockdown and the resulting school closures, the learning and living environments of students changed fundamentally. This article aimed to explore what these heterogenized learning environments meant for educational inequalities in Germany. More specifically, our research interest was to find out how well parents were able to help their children with schoolwork during the homeschooling period, depending on the following socio-economic factors and resources: parental education, books at home, parental aspirations, social capital, and sufficient technical equipment. Based on previous findings, it could be assumed that the lack of resources of socially less privileged students lead to an increase in educational inequalities during homeschooling periods.

To examine the extent to which the known mechanisms of social inequality are relevant during the school closure period, we analysed data from the German National Educational Panel Study (NEPS).

Our results show that high-status parents were more able to help their children with schoolwork. This finding is in line with expectations since parents with a high social status, on average, have more resources available to invest in the education of their children. They not only have higher incentives to support their children (as explained by status maintenance motives) but are also able to actually provide the necessary support on their own, even in critical situations like the lockdown situation.

The multivariate results revealed that especially the number of books and the parental educational qualifications are strong mediators. This is in line with our expectations since it is well known that the number of books as objective cultural capital is highly correlated with the educational aspirations and orientations of the parents. Parents who invest in this capital hold high educational aspirations for their children and invest in their educational success. The same holds for educational qualifications, which not only strongly correlate with the number of books but also reflect the own educational trajectories of the parents. Parents who hold high qualifications will have a strong incentive to enable their children to reach these as well since they are aware of the exceptional influence of education on the life course. Our results show that high parental aspirations do not have an independent effect on the ability to help, while technical equipment and social capital do. To explain the lack of an effect of parental aspirations, we argue that while aspirations do indeed differ across social groups (see Table A1 in the Appendix), we could only examine whether aspirations affect parents' *ability* to help their children, not whether they are *motivated* to do so. The fact that they can help during such an extraordinary situation is therefore conditioned more by the actual circumstances and possibilities of the parental home than by their aspirations. This explanation is corroborated by the result that an independent effect can be demonstrated for the parents' social network. In addition, this explanation is also supported by the effect that parental working conditions have on parental help. Even when all

mediators are taken into account, there is a significant negative impact on parental support when parents do not work from home. So although this is not a genuine mechanism of social inequality, this effect shows the consequences of parents having a much more limited ability to shape their children's learning environment. The same applies to being a single parent, which is also associated with a lower probability of being able to help.

Even though our results are insightful, there are several limitations. First, we do not have an objective measure of parental support. Only the self-reports of parents who assessed their support options themselves. This self-assessment could differ by social status due to a different understanding and/or different levels of social desirability. Also, we do not have any data from the children, who might rate their parents' abilities differently. Secondly, the respondents of SC2 are members of a selective group, which has already been scientifically monitored for the last ten years. This group contains a high proportion of highly educated parents. We have tried to consider this circumstance through the use of imputation and weighting, but it should still be taken into account when trying to generalize our findings.

Concerning the question of what the school closures mean for educational inequalities in Germany, our findings indicate that these inequalities may be getting stronger. Socially disadvantaged parents have less material and immaterial resources to maintain an education-promoting learning environment. And as the results from the Summer Learning Loss research suggest, the longer the homeschooling phase lasts, the wider the social gap is likely to become. However, we also see that the families' technical equipment is positively correlated with the likelihood that the parents can help their children. Thus, providing a sufficient digital infrastructure in educational institutions would not only help students and teachers to stay in touch, but also help parents across all social groups to maintain an educationally supportive learning environment. From this perspective, promoting further digitalisation in the school context would help to reduce inequalities. However, technical equipment can only compensate for a part of the differences. Especially when it comes to imparting knowledge or explaining specific school contents, low-educated parents are at a disadvantage. Therefore, this group needs strong (virtual) school support to compensate for existing deficits in the learning environment at home. Considering the unprecedented circumstances and increased workload for teachers, this is certainly a great challenge for schools.

We believe it is likely that this inequality in parental support will also manifest itself in differences in competence development. Further research should therefore address this issue and examine how students' competence developments differ according to social background. This aspect in particular will play an immense role even after the pandemic has been contained, as educational inequalities ultimately manifest themselves in unequal life and career trajectories.

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Appendix

Table A1: Descriptive comparison of extreme ISEI groups for all variables of interest

	Low ISEI		High ISEI		Diff
	Mean	SD	Mean	SD	
Being able to help with schoolwork	3.53	1.18	3.85	1.08	*
Parental ISEI	37.15	6.82	83.90	4.33	***
Low education	0.68	0.47	0.02	0.15	***
Higher education eligibility	0.25	0.43	0.06	0.25	***
Tertiary education	0.07	0.26	0.91	0.28	***
Migration background	0.35	0.48	0.18	0.39	***
Eastern Germany	0.15	0.36	0.16	0.37	-
Single parent	0.26	0.44	0.09	0.29	***
Parental support with homework in 2015/16	3.40	1.10	3.06	1.10	***
Time child spends with learning	15.05	9.47	16.62	8.57	-
Time parents support the child	6.69	7.85	4.25	4.68	***
Difficult to motivate child at home	3.16	1.32	2.94	1.29	-
Home Office	0.20	0.40	0.39	0.49	***
Not at home	0.70	0.46	0.45	0.50	***
Partly home	0.10	0.30	0.16	0.37	-
0-100 books	0.54	0.50	0.09	0.28	***
101-200 books	0.23	0.42	0.16	0.37	*
More than 200 books	0.23	0.42	0.75	0.43	***
Social capital STD	-0.47	1.12	0.35	0.76	***
Technical Equipment	3.39	0.81	3.63	0.66	**
High parental aspirations	0.61	0.49	0.96	0.20	***
Female pupil	0.53	0.50	0.48	0.50	-
Lower school	0.28	0.45	0.06	0.23	***
Comprehensive school	0.33	0.47	0.10	0.31	***
Upper secondary school	0.39	0.49	0.84	0.37	***
Age of pupil in 2020	14.21	0.37	14.11	0.32	***

Data: NEPS SC2 ([doi:10.5157/NEPS:SC2:9.0.0](https://doi.org/10.5157/NEPS:SC2:9.0.0)). Own Illustration, imputed data. Low ISEI: lower than one standard deviation from the mean. High ISEI: larger than one standard deviation above the mean. Significance levels are derived from linear OLS models as an equivalent of t-tests with imputed data and should be seen as approximations.

* $p < 0.05$ ** $p < 0.01$ *** $p < 0.001$