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ABHANDLUNGEN

Educational Inequality in Secondary Education: The Importance of Parental Practices for Educational Success

Elif Sari · Christoph Homuth

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Abstract International research shows that parental practices can explain a relevant part of social inequality in the educational system. These practices vary by parental endowment with education-relevant capital and are strongly connected to the social origin and habitus of the parental home. In explaining educational inequality in Germany, sociological researchers have so far paid little attention to parental support in everyday life. Little is known about how parental practices differ by social origin and what impact they have on educational outcomes, especially in secondary education. Building on the social reproduction theory, we expected parental practices to play an important role in explaining social inequality in educational achievement. Using multiple linear regression models (OLS), we analyzed the association of parental practices during lower secondary schooling with (a) attaining an upper secondary school leaving certif cate (*Abitur*; $N = 5048$) and also, for those who attained the *Abitur* ($N = 2959$), (b) students' competencies in upper secondary school and (c) students' f nal grade point averages (GPAs). We used data from the starting cohort of f fth-graders (SC3) of the German National Educational Panel Study (NEPS). The results showed that students whose parents engaged in certain parental practices were more likely to attain an *Abitur* and had higher competencies and a higher f nal GPA. Parental practices involving educational and cultural dialogue, such as discussing books, in particular, showed small but statistically signif cant positive associations with these outcomes. However, parental practices only

✉ E. Sari
Bamberg Graduate School of Social Sciences (BAGSS), University of Bamberg
Feldkirchenstraße 21, 96052 Bamberg, Germany
E-Mail: elif.sari@uni-bamberg.de

✉ E. Sari · C. Homuth
Working unit 'Educational Decisions and Social Inequality', Leibniz Institute for Educational Trajectories
Wilhelmsplatz 3, 96047 Bamberg, Germany

marginally contribute to explaining social inequalities in educational outcomes since social differences continue to persist relatively independently of these practices.

Keywords Educational inequality · Parental practices · Social inequality · Cultural capital · Parental involvement · Secondary education

Bildungsungleichheit in der Sekundarstufe: Die Bedeutung elterlicher Praktiken für den Bildungserfolg

Zusammenfassung Internationale Forschung zeigt, dass elterliche Praktiken einen relevanten Teil der sozialen Ungleichheit im Bildungssystem erklären können. Diese Praktiken variieren je nach Ausstattung der Eltern mit bildungsrelevantem Kapital und sind stark mit der sozialen Herkunft und dem Habitus des Elternhauses verbunden. Bei der Erklärung von Bildungsungleichheit in Deutschland hat die soziologische Forschung bisher der elterlichen Unterstützung im Alltag wenig Aufmerksamkeit geschenkt. Es ist wenig darüber bekannt, wie sich elterliche Praktiken nach sozialer Herkunft unterscheiden und welchen Einf uss sie auf den Bildungserfolg, insbesondere in der Sekundarstufe, haben. Ausgehend von der Theorie der sozialen Reproduktion gehen wir davon aus, dass elterliche Praktiken eine wichtige Rolle bei der Erklärung sozialer Ungleichheit im Bildungserfolg spielen. Mit Hilfe von multiplen linearen Regressionsmodellen (OLS) analysierten wir den Zusammenhang elterlicher Praktiken während der Sekundarstufe I mit (a) dem Erwerb der Hochschulreife (Abitur, $N = 5048$) sowie – für diejenigen, die das Abitur erreicht haben ($N = 2959$) – (b) den Kompetenzen in der Sekundarstufe II und (c) der Abiturnote. Dazu verwendeten wir Daten der Startkohorte der Fünftklässler (SC3) des Nationalen Bildungspanels (NEPS). Die Ergebnisse zeigten, dass Schülerinnen und Schüler, deren Eltern bestimmte elterliche Praktiken ausübten, mit höherer Wahrscheinlichkeit das Abitur erreichten, höhere Kompetenzen aufwiesen und bessere Abschlussnoten erzielten. Insbesondere Praktiken, die einen Dialog über bildungsrelevante und kulturelle Aspekte beinhalteten, wie z. B. das Sprechen über Bücher, zeigten statistisch signifk ante positive, wenn auch schwache Zusammenhänge mit den Bildungsoutcomes. Allerdings tragen elterliche Praktiken nur sehr marginal zur Erklärung sozialer Ungleichheiten im Bildungserfolg bei, da soziale Unterschiede unabhängig von diesen Praktiken weiterhin bestehen bleiben.

Schlüsselwörter Bildungsungleichheit · Elterliche Praktiken · Soziale Ungleichheit · Kulturelles Kapital · Elterliches Involvement · Sekundarstufe

1 Introduction

Parental practices that potentially benef t children's education—ranging from diffuse everyday interactions to more targeted forms of guidance—play an important role in explaining educational inequality, as shown in international research (see, e.g., Hamilton et al. 2018; Redfort et al. 2009; Lareau 2015). These practices are shaped

by families' cultural, social, and economic capital, transmitted across generations, and closely linked to social origin and habitus (Bourdieu 1983). The habitus determines everyday practices that vary systematically across social groups (Bourdieu 1984). Through the intergenerational transmission of cultural capital in the form of, e.g., subject-specifc knowledge and skills or familiarity with educational norms (Bourdieu 1983), socially privileged families better equip their children to meet institutional expectations and to navigate the educational system.

In Germany, educational inequality is well documented (e.g., Büchler 2016; Horneber and Weinhardt 2018), yet some aspects of the extensive inequality remain unexplained. Little attention has been paid to how everyday parental practices affect students' academic achievement, especially during secondary schooling. Research has instead focused on secondary effects (educational decisions) over primary effects (achievement differences) of social origin (Boudon 1974),[1] even though both seem equally important (Scharf et al. 2020). While there has been extensive international research, particularly in the United States, into how parents from different social backgrounds intentionally and unintentionally mobilize their cultural capital to support their children (e.g., Lareau 2002, 2015; Armstrong and Hamilton 2015), German studies have so far mainly shed light on specif c areas of parental involvement. While parental involvement is typically defned as an intentional act, we use the broader term *parental practices* to include both intentional and unintentional behaviors.[2] For Germany, for example, studies on family reading practices (McElvany et al. 2009) and parental help with school and homework (see, e.g., Dumont 2012; Moroni et al. 2016; and Luplow and Schneider 2018 for an overview) provide important insights into how certain forms of parental support affect specif c forms of educational success, yet they cover only some areas of parental involvement. What is missing is a comprehensive study examining a broader range of intentional and unintentional parental practices that shape academic achievement.

According to previous research, students' competencies explain only about one-third of the total variance in secondary school grades and do not fully mediate the effect of social origin on grades (Bittmann and Mantwill 2020). This suggests additional mechanisms at work—such as parental practices—that inf uence educational outcomes. Bourdieu (1983, 1984) argued that socially privileged families transmit capital—both explicitly through direct support and implicitly through behaviors that align with institutional expectations—thereby fostering academic success and reproducing inequality. His theoretical argument is also supported by f ndings that show that even in *Gymnasium*, Germany's academic and highly selective secondary school track, students from less educated families who enter secondary school with

[1] According to Boudon (1974), the primary effect refers to the sum of all inf uences on academic performance and personal development stemming from unequal resources, while the secondary effect occurs when educational choices differ by social class despite equal performance.

[2] In many studies, parental involvement is framed as an intentional parental decision to act, while parental practices in general can also include actions that happen unintentionally. However, systematic reviews show that there is no universal def nition of parental involvement and, depending on the study, this more or less also includes unintentional and non–goal-directed actions by parents (see Georgiou 1996; Boonk et al. 2018). We use the term *parental practices* to cover unintentional actions as well, knowing that there is a large overlap between parental practices and parental involvement.

excellent grades often fall statistically signif cantly behind peers from more-educated families with comparable starting grades by grade 9 (Horneber and Weinhardt 2018).

This paper aims to contribute to existing literature by examining the role of parental practices in the formation and persistence of educational inequality in two specif c ways. First, the relationship between parental practices and certain forms of educational success at the end of secondary schooling is analyzed using longitudinal data instead of relying primarily on cross-sectional data. This educational stage has received less attention than earlier stages of inequality.

Second, the study takes a closer look at parental practices that are expected to be benef cial for children's educational success. By adopting a broader perspective that includes both intentional and unintentional parental behaviors, as well as children's competencies, this study aims to provide new insights into how these practices may contribute to educational inequality.

Using data from the German National Educational Panel Study (NEPS), we analyzed the relationship of parental practices using three different outcomes: f rst, the attainment of an upper secondary school–leaving certif cate (*Abitur*), which is the key to tertiary education and higher occupations; second, the relationship between parental practices and students' competencies, as it is theorized that some parental practices infuence competencies that in turn lead to higher educational degrees or higher grade point averages (GPAs; Sullivan 2001); and third, the association of practices with students' GPAs at the end of upper secondary education for those who attained the *Abitur*. The fnal GPA is particularly important because it infu - ences the f eld of study that students can pursue, as access to higher education in Germany is primarily regulated by fnal grades rather than by an objective measurement of competencies and skills (e.g., through admissions restrictions such as the *numerus clausus*). If students decide to pursue an apprenticeship instead, the GPA affects their chances of transitioning to vocational training and serves as a strong productivity signal to employers (Velten and Schnitzler 2011).

Following Bourdieu's theoretical framework, we expect to f nd a positive association between educationally relevant parental practices and children's educational outcomes. Therefore, the analysis pays particular attention to parental practices rooted in cultural capital, which are hypothesized to foster academic success.

2 Theoretical Framework and Hypotheses

A practice can be def ned as a "bundle of knowledge-dependent behavioral routines" (Reckwitz 2003, p. 291), and parents do not always use practices intentionally or consciously. Practices result from a certain habitus (Bourdieu 1984), which is infuenced by the available resources and the varying social circumstances. Bourdieu describes the habitus as "schemes of perception, conception, and action" into which all of a person's previous experiences are incorporated (Bourdieu 1976, p. 86). This means that varying conditions of growing up produce different forms of habitus, which therefore vary depending on the social position. This variation in habitus creates systematically different forms of daily behaviors and practices (Bourdieu

1984, p. 260). Therefore, practices are implicitly and unconsciously based on specifc knowledge, meaning a specif c way of understanding and interpreting the world (Reckwitz 2002).[3]

Depending on the social origin and the availability of economic, social, and cultural capital, children are socialized differently, exposed to different values and parental practices, and ultimately have different opportunities to beneft from their parents' capital (Bourdieu 1984). According to Bourdieu's theoretical assumptions, as a "time of accumulation" (Bourdieu 1983, p. 188), the period of socialization within the family provides children the opportunity to acquire useful skills effortlessly and usually unintentionally. Accumulation of cultural capital from early childhood onward is most eff cient in families that already possess a lot of cultural capital. School education is oriented toward the middle class, which means that middle-class students learn the linguistic codes that are used later in school from an early age and are raised in a specif c way of life that is suited to the school culture. Lower-class children must work hard to adapt adequately to this culture (Bourdieu and Passeron 1979).

As "permanent dispositions of the organism" (Bourdieu 1983, p. 185), cultural capital includes both subject-specifc knowledge and skills and an understanding of educational norms (Bourdieu 1983). For university students, for example, Bourdieu identif es knowledge about the university cosmos, linguistic casualness, and the "purposeless education" (Bourdieu 2018, p. 11) gained in out-of-school settings as the most useful forms of cultural capital. The inf uence of family background on educational success is almost exclusively based on cultural capital (Bourdieu 2018), and cultural capital is the families' "best hidden and socially most effective educational investment" (Bourdieu 1983, p. 186). In summary, embodied cultural capital becomes part of a person's habitus through a time-consuming process of internalization. Habitus, in turn, shapes and structures practices that subconsciously adapt to objective opportunities and social expectations.

We argue that parental practices can be understood as mechanisms of social inequality that happen every day and differ according to social status. Due to the higher amount of cultural capital, socially privileged parents will more often use practices that draw on their cultural capital (e.g., talking about books with their children or teaching them education-oriented values such as understanding the school content and not just memorizing it). However, since such behaviors are mainly part of the cultural heritage of more privileged social classes, this leads to the perpetuation of cultural privilege and the legitimization of inequality.

While the concept of practice is central to Bourdieu's (1977) theoretical framework, he did not develop a systematic typology of parental practices. Our approach takes Bourdieu's notion of practice as a starting point and translates it into empirically observable dimensions in educational contexts, refectin g how cultural capital generates social advantages.

[3] Conceptually, parental practices can be distinguished from parenting. Parenting refers to planned and intended actions that are meant to inf uence personality development in a certain way (Hurrelmann and Bauer 2018), while practices also include unintended actions.

In line with Bourdieu's explanations, we focus on two pathways of influence. First, there are parental practices that directly function as a conduit to transmit parents' incorporated cultural capital in the form of knowledge to their children. Examples include being available to answer questions and providing direct support by explaining school content. The second pathway involves parental practices that shape their children's habitus more diffusely, bringing them closer to the school's cultural norms, particularly through exposure to highbrow cultural forms and fostering reflective capacities. This way, students learn how to think, behave, and express themselves in a way that is valued in school and that will result in a higher chance of educational success. In the following, we refer to both kinds as educationally beneficial parental practices. Although other parental practices may also play a role, based on Bourdieu's arguments, we consider these two kinds to be particularly central, without implying that this selection is exhaustive, as the theory itself does not provide a complete typology.

Building on the perspective that cultural capital is especially relevant for parental behavior, and given that its availability depends on the social status of the parents, we formulate our first hypothesis about the expected difference in behavior of the parents:

H1 Parents who possess a high amount of cultural capital engage more often in educationally benefcial parental practices than parents who possess little cultural capital.

Parental practices can lead to both primary and secondary effects of social origin (Boudon 1974). Parental practices contribute to primary effects when they directly promote children's skills—for example, by facilitating their understanding of content or exposing them to cultural forms that are valued in school. Parental practices affect secondary effects because they can shape educational decisions, e.g., when they promote reflective conversations or discussions about educational pathways and career options. Secondary effects are particularly relevant at transitions, e.g., from elementary school to secondary school. Still, they can also have an impact in secondary school, for example, when deciding whether to remain at the same type of school or to perhaps choose a specialized track.

On the one hand, practices such as parents explaining classroom content can have a direct impact on achievement. Since higher-educated parents also have more educationally relevant capital available, such as expertise in certain subjects, than lower-educated parents do, they can provide more comprehensive and effective support.

On the other hand, some practices belong to the category of *purposeless education*, i.e., learning without immediate instrumental intentions, and can have a similar direct impact on student achievement—for example, because certain practices that are valued in the school system (such as a certain way of expressing oneself or familiarity with highbrow culture) are passed on to children. This can manifest in better argumentation skills or a certain form of comfort and self-confidence, which Khan (2011, p. 77) refers to as "ease of privilege," in dealing with the field of education and its institutions.

These skills can have a direct impact on grades (e.g., in writing assignments). The less purposeful and more diffuse nature of those practices indicates that it is a matter of continuously shaping a living environment conducive to learning.

For example, parents with a good understanding of mathematics may be able to explain tasks clearly to their children, which in turn may have a direct impact on their children's mathematical competence. In the case of German, for example, it can be argued that parents with a good understanding of German will use academic language in conversations with their children or will discuss school-relevant works of literature with them so that the children's German competencies will also be higher. So, with regard to the *competencies*, we can hypothesize the following:

H2 Education-related parental practices have a positive effect on children's competencies.

It is not only the competencies themselves that are important for students' educational careers but, ultimately, the school grades that are refected in the attainment of diplomas and final GPAs. Competencies and grades differ in important ways. Competence scores provide a more standardized evaluation of cognitive abilities. In contrast, grades and diplomas reflect not only subject knowledge but also how students' performance is perceived and evaluated within the school setting. This includes teacher perceptions, classroom behavior, and compliance with school norms. Consequently, a student's cultural capital, acquired through parental practices, can influence these evaluations, which may vary according to social origin.

Since both of these elements cover different aspects of academic performance, it makes sense to look at both types of outcomes in order to get a broader picture. We therefore propose the following hypothesis:

H3 Education-related parental practices have a positive effect on (a) the chance of attaining the *Abitur* and (b) the GPA.

Upper social classes tend to shape children's habitus by promoting the acquisition of valued skills at school. Since such practices positively influence educational success, we see them as mechanisms to explain the social inequality of educational opportunity and success. So, due to the differences in social origins and capital that go hand in hand with differences in parental practices, the following final hypothesis can be stated:

H4 The effect of social origin on educational achievement and attainment is mediated by educationally benefcial parental practices.

3 State of Research

In Germany, social origin remains closely linked to educational success at the end of secondary schooling, as the latest Programme for International Student Assessment (PISA) study confirms (OECD 2023). Data from later stages of the educational path-

way show that children from academic homes are three times more likely to attend university (79%) than children whose parents have completed only vocational training. For unskilled parents, the probability drops even further, to 12% (Autorengruppe Bildungsberichterstattung 2018).

Previous research on the social inequality of educational opportunity in Germany has strongly emphasized early and primary education; in particular, the transition from primary to secondary school has extensively been considered in inequality research because it marks a pivotal point in educational biography where social inequality has far-reaching effects (see Büchler 2016; Meulemann and Relikowski 2016; Dollmann 2010; for an overview, see Dumont et al. 2014). At this transition point, students in Germany are divided into two to three school tracks (depending on the federal state) predominantly based on previous achievement (Becker et al. 2017).[4] However, effects of social origin are also apparent in the secondary school phase of the academic career (Horneber and Weinhardt 2018; Schneider and Tieben 2011), although with regard to competence development, the findings for Germany are somewhat mixed (Neumann et al. 2014), partly because it is difficult to capture competence trajectories by social origin, as many studies focus mainly on students within school types, making only implicit statements about competence trajectories by social origin possible (ibid., p. 19).

Regarding parental practices, there are currently only a few studies (McElvany et al. 2009; Bornkessel and Kuhnen 2011; Baumert et al. 2003; Watermann and Baumert 2006) that pay attention to the impact of parental practices in secondary education, and no studies have analyzed their effects across the different secondary school types on educational success at the end of secondary schooling.

Internationally, many studies show that parental involvement[5] in most cases has a positive effect on educational attainment and achievement (see, for example, the meta-analyses by Wilder 2023; Tan et al. 2020; Jeynes 2010). In their meta-analysis, Hill and Tyson (2009) concluded that parental involvement in secondary education can be categorized into three groups of practices: (1) home-based practices, such as helping with homework, (2) school-based practices, such as participating in parent–teacher conferences, and (3) academic socialization practices, such as jointly working out learning strategies or plans for the future. Home-based practices are what parents are doing or refrain from doing at home that has an impact on children's

[4] The German educational system is tracked. After primary school, commonly after fourth grade, students are sorted to different secondary schools depending on their performance and the regulations of the federal states. The highest achieving students usually are those who go to *Gymnasium*. *Gymnasium* strongly emphasizes academic learning, and at the end of upper secondary education, students take the *Abitur* examination, which leads to a university entrance qualification. Upper secondary education usually refers to the final 2 to 3 years of *Gymnasium* (depending on the federal state). Most other secondary school tracks do not lead to a university entrance qualifcation and have a shorter duration. These include, for example, *Realschule*, offering a general secondary education, and *Hauptschule*, which provides basic education and vocational preparation. Due to federalism, various types of secondary schools exist, and alternative pathways to higher qualifcations are possible but less common.

[5] The broader term *parental practices* is not yet established in the literature and is therefore rarely used, whereas there are numerous publications on the topic of *parental involvement*. To accurately reflect the current state of research, this section uses the term *parental involvement* as used by the mentioned authors themselves.

educational success, while school-based practices describe what parents are doing (or not) at the children's schools. Academic socialization refers to parental practices that promote learning and future orientation and provide the children with the means to feel comfortable and prof cient at school. Of these three, academic socialization practices show the strongest positive effects in secondary education (Hill and Tyson 2009). Although academic socialization as a bundle of parental practices has been studied repeatedly, there is not a consistent understanding of this concept (see Bæck 2017). Bæck (2017) describes academic socialization as involving practices that lead to the acquisition of "norms, values and knowledge related to education and the importance of education" (Bæck 2017, p. 125). Hill and Tyson's classif cation is primarily an empirical framework that categorizes parental involvement on the basis of numerous studies. However, from Bourdieu's theoretical perspective, these categories can also be understood as a ref ection of underlying social structures and the distribution of cultural capital. For example, home-based practices, such as parents helping to prepare a presentation for school, are closely linked to the parents' incorporated cultural capital, i.e., the skills, knowledge, and dispositions acquired through socialization that enable parents to provide help with advanced homework, whereas lower-educated parents may lack the skills to do so. Whereas parental academic socialization practices transmit cultural capital, shaping the child's habitus through parental values toward education and fostering their ability to navigate the educational system effectively, school-based practices can raise parents' awareness of school expectations and curricula.

Studies with German data have primarily focused on parental help with schoolwork (see Luplow and Schneider 2018 for an overview). This type of parental practice appears to have a negative or no effect on academic achievement, and it can be assumed that parents tend to resort to this type of support as a reaction when their children seem to have poor grades (see Helmke et al. 2004; Wild and Gerber 2007; Luplow and Smidt 2019; Luplow and Schneider 2018). While this type of practice has already been analyzed using German data, the diversity of parental practices from an inequality perspective has not yet been comprehensively examined—there are only a few studies that deal with parental practices and differentiate according to social origin. McElvany et al. (2009) found that stronger reading socialization takes place in socially more privileged homes, which has a positive effect on reading skills, and Bornkessel and Kuhnen (2011) found that parents' requests for learning support have a negative effect on the *Abitur* grade, while conversations about political, social, and school issues have a positive effect on the GPA of the *Abitur*. Baumert et al. (2003) and Watermann and Baumert (2006) offer the most comprehensive studies so far for the secondary school phase: They used PISA data to investigate how communicative practices (e.g., conversations about cultural topics) and cultural practices (e.g., attending cultural events together) affect educational participation and the acquisition of skills, and found that the effects of social origin are primarily infu enced by the cultural practices of the families. These are, however, analyses with cross-sectional data at the end of lower secondary school (grade 9), thus hindering the causal interpretation of these f ndings.

In contrast, international studies have shown that a comprehensive analysis of intrafamily processes makes social inequality–generating mechanisms visible across

the entire academic career (see, e.g., Lareau 2015, 2002; Redfort et al. 2009; Witteveen and Attewell 2017; Hamilton et al. 2018; Khan 2011). In her ethnographic research, Lareau (1987) observed that in contrast to working-class children, middle-class children are more *shaped* through what Lareau (2002) called "concerted cultivation" and acquire (educational) institutions' logic through continuous contact with them (Lareau 2002, pp. 748–749): Middle-class families have more open and frequent discussions, children learn an academic language, and parents engage more often with their children by asking questions about their everyday lives. Furthermore, they encourage their children to speak up for themselves to other adults and not to be shy, and they advocate more for their children in school-related issues. Overall, this ultimately leads to the children feeling more at ease in various institutions, dealing with them more confidently, and acquiring behavioral patterns that will be beneficial to them in their future lives (Lareau 2003). Referring to the classification of Hill and Tyson (2009), the practices that Lareau describes can primarily be located in the field of academic socialization and have long-lasting positive effects (Lareau 2015). Similarly, Jæger (2022) argues that cultural capital is mainly a set of noncognitive skills (e.g., academic confidence) that parents transmit to their children. Further studies have confirmed these findings and show the positive influences of parental practices on students' achievement (Redfort et al. 2009). A German study also found a moderate influence of enrolment in music on the skill development of 5-year-old children (Mikus et al. 2021).

Several studies have shown that there is a strong link between parental cultural capital and school success in general: While primarily the children of well-educated parents with a pronounced orientation toward high culture attend *Gymnasium* more often, economic factors such as frequent unemployment have a minor influence on the school type (Rössel and Beckert-Zieglschmid 2002). Additionally, Mikus et al. (2020) showed the symbolic and skill-generating functions of cultural capital (see also Grgic and Bayer 2015).

In summary, parental practices differ along the social structure and are very variable in their manifestation. In particular, studies from the United States show what these practices look like in concrete terms, how far they reach beyond the transition from primary into secondary schooling, and what impact they have on the educational paths of students. Although specific types of parental practices, such as helping with schoolwork or having conversations about school, have been examined in some studies, there is still a lack of studies that look at a wide variety of practices from an inequality perspective. This paper, therefore, contributes to filling this gap in sociological research. In addition, panel data such as the NEPS offers great potential, as it takes into account not just one but several points in the life course and therefore allows also a focus on educational trajectories. Furthermore, the inclusion of competencies allows a better understanding of the sole effect of social origin.

4 Data and Methods

4.1 Data

We used the data from the NEPS for the empirical analyses to test our hypotheses.[6] To investigate the association between parental practices and educational success, we used data from the starting cohort grade 5 (starting cohort 3; SC3), which includes secondary school students who were f fth-graders in winter 2010/2011 (NEPS Network 2024). The children's parents were also interviewed. This large-scale dataset provides representative longitudinal data on educational processes and decisions in Germany from the beginning of secondary schooling until the end of secondary schooling and beyond.

The data allowed us to examine parental practices that occurred during grade 7 through grade 9 (e.g., how often parents and children talked about topics discussed in class or whether parents were buying additional learning materials) and their associations with (a) attaining an upper secondary school–leaving certif cate (*Abitur*; $N = 5048$), (b) reading and mathematics competencies of those who attended upper secondary education ($N = 2959$), and (c) the GPA of the school-leaving certif cate (*Abiturnote*) of those who had completed upper secondary education ($N = 2959$). We included the information of all panel waves, which cover 16 years after school enrollment, to also include students who repeated one or more classes or achieved the *Abitur* after a detour in other educational tracks, including vocational educational training. While the analytical dataset was structured cross-sectionally for this study due to the limitation of the data, as predictors were only sparsely measured during the course of the panel, the longitudinal nature of the data allowed us to maintain the temporal ordering of parental practices and educational outcomes.

4.2 Operationalization

We looked at *three main educational outcomes*: First, we analyzed for all secondary school students whether they achieved the *Abitur* ($N = 5048$); this school-leaving certifcate is successfully attained after 12 or 13 years of schooling. Then we examined the association of parental practices with competencies in upper secondary school for students who remained in the educational system ($N = 2959$). Specif cally, we used domain-specifc cognitive competencies in reading and mathematics that are usually assessed in the NEPS in grade 12 and measured by standardized tests (Fuß et al. 2021). Finally, we analyzed the GPA of those who attained the *Abitur*. The *central dependent variable* in the f rst analysis was therefore whether the students achieved the *Abitur* or not (dichotomous). The *central dependent variables* in the second analysis were the reading and mathematics competencies. The *central dependent variable* in the third analysis was the students' self-reported GPA at the end of upper secondary schooling.

[6] This paper uses data from the National Educational Panel Study (NEPS; see Blossfeld and Roßbach 2019). The NEPS is carried out by the Leibniz Institute for Educational Trajectories (LIfBi, Germany) in cooperation with a nationwide network.

Several parental practices were surveyed in NEPS-SC3 (e.g., "*How often does it normally happen that you talk with your mother or father ... about books?*" with answer options ranging from "*Never or seldom*" (= 1) to "*Every day*" (= 5)). The selection of these practices was based on theoretical considerations regarding educationally relevant cultural capital and its transmission (Bourdieu 1983), empirical evidence from the literature, and what is available in the NEPS data. Unfortunately, the NEPS includes only a limited set of items capturing parental practices that are likely to be benefcial for students' educational careers. Specifcally, we included practices that refect different dimensions of parental practices that are described in the literature as benefcial and that stem from differences in cultural capital, such as using parental cultural capital to directly support the child, facilitating understanding by providing a good learning environment, establishing a distinctive culture of dialogue, and providing broader cultural exposure.[7] While some practices were included in the analysis as single items due to measurement restrictions, others were included as latent factor variables using principal component factors (Yong and Pearce 2013). This was done when the individual practices were measured at different times or if they did not match in terms of content and theory (e.g., attending cultural events does not measure the same thing as having extended conversations with parents). We conducted factor analyses to determine whether incorporating the factors was appropriate and whether they added value as factors rather than as individual variables. The resulting factors were deemed suitable (see Kaiser 1974): educational and cultural dialogue (eigenvalue = 1.50, Kaiser–Meyer–Olkin measure [KMO] = 0.60), facilitating understanding (eigenvalue = 1.71, KMO = 0.61), and direct support (eigenvalue = 1.98, KMO = 0.71). Table 1 presents the operationalization of the included parental practices, showing in which grade the questions were asked and whether parents or students were the informants. Table 6 in the Appendix presents an overview of the question texts for all survey items related to parental practices.

In general, student data were collected through paper-based, self-administered interviews, and parent data were collected through computer-assisted telephone interviews.

The students' social origin was measured using the highest educational level of their parents (low and intermediate education, higher education eligibility/*Abitur*, university education).[8] Formal education serves as the central indicator of institutionalized cultural capital (Bourdieu 1983) and is used in the analyses as a proxy for parents' available cultural capital.

We also included a set of *control variables*. These contained students' age and gender, as well as a dummy variable def ning the migration background of the

[7] This is, of course, not an ideal operationalization. However, this is the reality in many datasets that are available for secondary use.

[8] We did not use a classif cation that includes vocational education (e.g., CASMIN) because a) the theoretical foundation shows that school and university education are the main relevant factors and b) since students who are on the academic track (*Gymnasium*) are working toward a university entrance qualif cation, the relevant difference in parental education should be whether they have studied or not or at least whether they have an *Abitur* themselves. As a robustness check, however, the analyses were also conducted using the families' highest socioeconomic status, and the effects were comparable in terms of direction and strength.

Table 1 Operationalization of parental practices related to educational success

Parental practice	Included variables	Informant	Time frame
Extended parent–child conversations	Joint parent–child activities: long conversations about topics of interest	Parent	Grade 7
Joint cultural activities	Joint parent–child activities: visit to a museum	Parent	Grade 7
Facilitating understanding	1. Parents invest time when child has problems with homework	Student	Grade 8
	2. Child can talk to their parents when they don't understand school content		
	3. Parents want child to understand content, not just memorize it		
Direct support	1. Assisting in preparing presentations for class	Student	Grade 8
	2. Buying additional learning materials or books for learning		
	3. Talking about problems at school		
	4. Talking about topics covered in class		
Educational and cultural dialogue	1. Discussion about books	Student	Grade 9
	2. Discussion about art and works of art		
	3. Discussion about political and social issues		
	4. Parents as information sources for occupational orientation		

students (1 = student or parents immigrated, otherwise 0). Because of the differences in the school systems across the 16 federal states, we controlled for both the federal state and the type of secondary school students attended in certain grades: In *grade 6*, this included (a) school without track yet (*Grundschule, Orientierungsstufe, Gesamtschule*), (b) school for basic secondary education (*Hauptschule*)/intermediate secondary school (*Realschule*)/school with several educational programs, and (c) *Gymnasium*. In *grade 10*, the categories were (a) comprehensive or integrated secondary school, (b) school for basic secondary education/intermediate secondary school/school with several educational programs up to grade 10, (c) *Gymnasium*, and (d) students who left general-education schooling before grade 10. For *grade 12*, we distinguished between (a) specialized/vocational *Gymnasium*, (b) comprehensive school, (c) *Gymnasium*, and (d) other vocational school. In some models, we also controlled for students' basic cognitive skills in perceptual speed and reasoning,[9] as well as for reading and mathematics competencies (see Fuß et al. 2021) in grade 5 to account for the initial selectivity at the beginning of secondary school. Because substantial differences already exist at the end of primary school, these controls help to better isolate the effects of parental practices during secondary schooling.

[9] These two basic cognitive skills were included in the NEPS study because they are described as central indicators of "cognitive mechanics" and "permit controlling for differential initial capacities in the competence acquisition process" in a relatively culture- and education-independent way (LIfBi 2024, p. 7).

However, it is important to acknowledge that such practices may themselves already be shaped by earlier differences.

4.3 Methods

We conducted a Spearman's rank correlation analysis to examine the association between parental practices, if and with which GPA the *Abitur* was completed, and parental educational background as a first step. We then ran multiple linear regression models (ordinary least squares; OLS) with robust standard error estimation to examine (a) attaining the *Abitur* as a function of parental education and parental practices during lower secondary schooling. All secondary students, regardless of their type/track of secondary school, were included in this analysis. In a second OLS regression analysis, we examined (b) students' competencies at the end of upper secondary schooling—for those who completed the *Abitur*—as a function of parental education and parental practices during lower secondary schooling. For these students with an *Abitur*, we also examined (c) their GPAs at the end of secondary education in a third OLS regression analysis.

To account for missing information due to nonresponse, we performed multiple imputations by chained equations with fully conditional specification (Van Buuren 2018) and imputed m = 50 datasets. To control for design effects, we also used the NEPS-SC3 design weights (Hammon and Landrock 2019) as well as other auxiliary variables (e.g., additional information on attended school track for each wave, additional competence data) to reduce selection and imputation bias.

Tables 7 and 8 in the Appendix provide a descriptive overview of our two samples. The tables include all variables and the share of missing and therefore imputed information for each variable. The comparatively high rate of missing data for items that were part of the parent questionnaire is due to a higher rate of unit nonresponse in the parent interview, which was only optional for students' panel participation. Additionally, many variables were asked only once because the survey content changes from panel wave to panel wave. The higher rate of missing information for the competence data in grade 5 is design based due to a sample enhancement in grade 7.

We conducted various robustness checks: varying the number of parental education categories, controlling for grades at the beginning of grade 5, using different factoring approaches, or clustering the regressions by school or grade to check the sensitivity of the results to our operationalization. Since there were no substantial differences in the effect directions and strengths and to avoid the risk of overcontrolling (see Grätz 2022), we decided to present models only including the essential variables.

5 Results

Figure 1 illustrates the strong link between parental education and academic success. On the left side is the distribution of who attained an *Abitur* and the parental education in the sample; on the right side is the distribution of the *Abitur* GPA and parental education in the sample. For a clearer presentation, the final grades in this

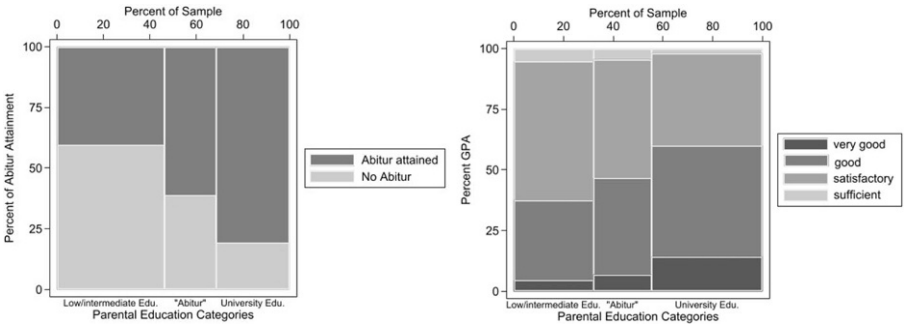

Fig. 1 Distribution of the *Abitur* attainment (*left*) and grade point average (GPA; *right*) with parental education. Data: NEPS-SC3. Left side: $N = 5048$; right side: $N = 2959$, multiple imputed data ($m = 50$). The size of each area is equal to the proportion in the sample

f gure were rounded to whole grades ranging from very good (= best) to suff cient (= worst). The area of each section represents the proportion of students within that parental education group. The left panel includes all secondary school students analyzed in the further multivariate analysis ($N = 5048$). It shows that less than half of the students with lower-educated parents attained an *Abitur*, while more than 75% of students with parents with academic backgrounds attained an *Abitur*. The right panel focuses on the students who attained the *Abitur* ($N = 2959$). It shows that students with university-educated parents had higher GPAs, and a smaller proportion of them had poor GPAs than did the students with lower-educated parents.

Table 2 contains the results of a Spearman correlation analysis. The coeff cients show that there were positive statistically signifcan t correlations between parental education and all the different types of parental practices. This means that higher education levels were associated with more frequent use of these practices. Also, all practices showed positive statistically signifcan t correlations with the attainment of the *Abitur*. In general, the correlations were rather weak to very weak. Educational and cultural dialogue practices had the highest statistically signif cant positive associations with students' attainment of the *Abitur* and students' GPAs. The positive correlation (0.05) with parental education but statistically insignifcan t relationship (–0.02) with GPA suggests that direct support was less relevant to academic success than other forms of engagement. The same applied for extended parent–child conversations (0.05 vs. 0.01).

In line with hypothesis 1, these results indicate that parents with higher levels of education were more likely to engage in educationally benefcial parental practices than parents with lower levels of education. These bivariate results also support hypothesis 3, as we saw some of the expected correlations between GPA and parental practices and attainment of the *Abitur* and parental practices.

Tables 3, 4, and 5 show the results of the multivariate regression analyses. In the following text, we do not present coeff cients for the controls. They are included in the detailed Tables 9, 10, and 11 in the Appendix. Besides controls, model 1 (baseline) only included the measure of parental educational level. In model 2, all types of parental practices were analyzed simultaneously, while in full model 3 we also

Table 2 Results of Spearman correlation analysis

Parental practices	*Parental education (N = 5048)*
Extended parent–child conversations	0.05***
Joint cultural activities	0.15***
Facilitating understanding	0.12***
Direct support	0.05***
Educational and cultural dialogue	0.14***
Parental practices	*Student attainment of the Abitur (N = 5048)*
Extended parent–child conversations	0.03*
Joint cultural activities	0.07***
Facilitating understanding	0.12***
Direct support	0.03*
Educational and cultural dialogue	0.17***
Parental practices	*Grade point average (N = 2959)*
Extended parent–child conversations	0.01
Joint cultural activities	0.04*
Facilitating understanding	0.08***
Direct support	–0.02
Educational and cultural dialogue	0.14***

Data: NEPS-SC3, multiple imputed data (m = 50), * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$; own calculations

included skills and competencies from grade 5. Including these initial competence measures in a separate model allows us to assess the infuence of parental practices both without and with control for prior achievement, which likely already ref ects socioeconomic background effects. In this context, the remaining effect of parental education in model 3 ref ects differential growth due to parental practices during secondary schooling net of initial disparities.

Model 1 in Table 3 showed a statistically signifcan t positive effect of high parental education (university degree) compared to low and intermediate parental education on the attainment of the *Abitur*. In model 2, educational and cultural dialogue showed a statistically signif cant positive effect on students' attainment of the *Abitur*. A one-standard-deviation increase in educational and cultural dialogue is associated with a three-percentage-points higher probability of attaining the *Abitur*. Comparing students whose parents engaged well below average in this practice (–1 standard deviation) with those whose parents engaged well above average (+1 standard deviation) corresponds to a difference of six percentage points in the probability of attaining the *Abitur*. To put this effect size into perspective: Students whose parents held an upper secondary school–leaving certif cate (*Abitur*) had around an eight-percentage-points higher probability of attaining the *Abitur* themselves than students whose parents had low or intermediate educational qualif - cations. While there was no statistically signif cant effect of direct support practices, there was a positive effect for facilitating understanding practices. Joint cultural activities and extended parent–child conversations did not show any statistically signif cant effect in any of the models. Thus, hypothesis 3, which posits a positive effect of educationally benefcial parental practices on educational attainment, was

Table 3 Determinants of students' attainment of the *Abitur* according to multivariate linear regression models (OLS)

Model (M)	M1		M2		M3	
	Control variables		Control variables + parental practices		Full model (M2 + skills/ competencies in grade 5)	
	Coeffc ient	SE	Coeffc ient	SE	Coeffc ient	SE
Parental education						
Low and intermediate education	Reference		Reference		Reference	
Higher education eligibility *Abitur*	0.09***	0.02	0.08***	0.02	0.08***	0.02
University degree	0.16***	0.02	0.15***	0.02	0.13***	0.02
Controls	✓		✓		✓	
Educational and cultural dialogue	–	–	0.03***	0.01	0.02***	0.01
Facilitating understanding	–	–	0.02**	0.01	0.02*	0.01
Direct support	–	–	–0.01	0.01	0.00	0.01
Extended parent–child conversations	–	–	0.00	0.02	0.00	0.02
Joint cultural activities	–	–	0.00	0.02	–0.01	0.02
Constant	2.28***	0.20	2.24***	0.20	1.85***	0.18
Adjusted R^2	0.51		0.51		0.53	

Controls: students' age, gender, migration background, federal state, type of secondary school
Data: NEPS-SC3, $N = 5048$, multiple imputed data (m = 50); * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$; weighted and unstandardized regression coeff cients; own calculations. *SE* standard error

supported for two types of parental practices: educational and cultural dialogue and facilitating understanding.

In model 3, we controlled for the two basic cognitive skills of perceptual speed and reasoning, as well as for reading and mathematics skills at the start of secondary schooling in grade 5, in order to take the differences that already exist at the beginning of secondary school into account and to measure the impact of parental practices on competence development during secondary schooling.

While the coeff cient size of parental education decreased, the effects of educational and cultural dialogue practices also decreased. However, the effects of educational and cultural dialogue and facilitating understanding remained statistically signif cant and robust. This implies that students whose parents showed more educationally benef cial practices had higher competencies at the beginning of secondary schooling. Table 3 shows a high adjusted R^2 in model 1, which hardly increases in models 2 and 3. This explained variance of more than 50% is mainly due to the signifcant impact of the type of secondary school on the probability of achieving the *Abitur* and the strong social origin effects associated with it, which are already at work before the start of secondary education and are a sign of strong path dependencies in the educational system.

In line with our hypothesis 4 that the effect of parental education is mediated by parental practices, the effect of high parental education was reduced when all practices were considered in the model (model 1 vs. model 2). However, the reduction is very small, suggesting that while the measured parental practices may account for part of the relationship, they explain only a very limited portion of the effect of parental education. Therefore, these findings provide some support for hypothesis 4 but also indicate that the influence of social origin on academic attainment remains complex and that there is a persistent influence of social origin on attainment of the *Abitur*.

Table 4 shows the influence of parental practices on reading and mathematics competencies. Model 1 showed a statistically significant positive effect of high parental education (university degree) compared to low and intermediate parental education for both competencies. When the parental practices were included in model 2, there was a statistically significant positive effect of educational and cultural dialogue for both competencies. This effect was particularly robust for reading, as the coefficient remained stable even after controlling for earlier competencies and skills in grade 5 in model 3, whereas in mathematics the effect disappeared. Although facilitating understanding showed a positive effect and remained statistically significant for mathematics in model 3, it was only significant at the 10% level for reading in model 2 and was not significant in model 3. There were therefore statistically significant influences of individual practices for both competencies. This supports hypothesis 2, which assumes that educationally beneficial parental practices have a positive effect on children's competencies.

The effect of parental education decreased slightly from model 1 to model 2 when parental practices were included in the analysis. This provides some possible support for hypothesis 4, suggesting that parental practices mediate the influence of social origin on educational attainment and achievement.

Table 5 shows the results of the analysis of the final GPA for students who attained the *Abitur*. Model 1 showed a statistically significant positive effect of high parental education (university degree) compared to low and intermediate parental education on students' *Abitur* GPAs. Therefore, this followed the same direction as the results of the analysis regarding attaining the *Abitur*. In model 2, there was a statistically significant positive effect of educational and cultural dialogue on GPA. A one-standard-deviation increase in educational and cultural dialogue is associated with an improvement of about 0.06 grade points in the final GPA. Comparing students whose parents engaged well below average in this practice (–1 standard deviation) with those whose parents engaged well above average (+1 standard deviation) corresponds to a difference of around 0.12 grade points on the GPA scale. Again, joint cultural activities and having extended parent–child conversations on topics of interest had no statistically signifcant effect on students' GPA, while facilitating understanding reached only the 10% signifcance level. There was a negative statistically signifcant effect of direct parental support. Because this effect disappeared when we controlled for skills and competencies in grade 5 in model 3, this suggests, as seen in other studies, that parents are more likely to intervene when their children perform less well at school. This parental practice could therefore be interpreted as a reaction rather than a general habit. This seems particularly plausible in secondary schooling,

Table 4 Determinants of students' reading and mathematics competencies according to multivariate linear regression models (OLS)

Competencies in grade 12	Reading						Mathematics					
Model (M)	M1		M2		M3		M1		M2		M3	
	Control variables		Control variables + parental practices		Full model (M2 + skills/ competencies in grade 5)		Control variables		Control variables + parental practices		Full model (M2 + skills/competencies in grade 5)	
	Coeff cient	SE	Coeff cient	SE	Coeff cient	SE	Coef.	SE	Coeff cient	SE	Coeff cient	SE
Parental education												
Low and intermediate education	Reference		Reference		Reference		Reference		Reference		Reference	
Higher education eligibility *Abitur*	0.12*	0.05	0.11*	0.05	0.09*	0.04	0.08	0.05	0.07	0.05	0.04	0.05
University degree	0.16***	0.04	0.14**	0.04	0.05	0.04	0.22***	0.05	0.20***	0.05	0.11*	0.04
Controls	✓		✓		✓		✓		✓		✓	
Extended parent–child conversations	–	–	0.01	0.04	0.03	0.04	–	–	–0.01	0.05	–0.00	0.05
Joint cultural activities	–	–	0.05	0.05	0.00	0.04	–	–	0.00	0.06	–0.03	0.05
Facilitating understanding	–	–	0.04+	0.02	0.03	0.02	–	–	0.07**	0.02	0.04*	0.02
Direct support	–	–	–0.07***	0.02	–0.01	0.02	–	–	–0.10***	0.02	–0.03+	0.02
Educational and cultural dialogue	–	–	0.10***	0.02	0.06***	0.02	–	–	0.06**	0.02	0.02	0.02
Constant	2.60***	0.62	2.44***	0.62	1.75**	0.58	4.51***	0.77	4.45***	0.77	3.27***	0.68
Adjusted R^2	0.16		0.19		0.34		0.27		0.28		0.47	

Controls: students' age, gender, migration background, federal state, type of secondary school

Data: NEPS-SC3, $N = 2959$, multiple imputed data (m = 50); + $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$; weighted and unstandardized regression coeffcients ; own calculations. *SE* standard error

Table 5 Determinants of students' grade point averages (GPAs) according to multivariate linear regression models (OLS)

Model (M)	M1 Control variables		M2 Control variables + parental practices		M3 Full model (M2 + skills/competencies in grade 5)	
	Coeffc ient	SE	Coeffc ient	SE	Coeffc ient	SE
Parental education						
Low and intermediate education	Reference		Reference		Reference	
Higher education eligibility *Abitur*	0.08*	0.03	0.07*	0.03	0.06^{+}	0.03
University degree	0.23***	0.03	0.22***	0.03	0.17***	0.03
Controls	✓		✓		✓	
Educational and cultural dialogue	–	–	0.06***	0.01	0.04**	0.01
Facilitating understanding	–	–	0.03^{+}	0.02	0.02	0.01
Direct support	–	–	–0.03*	0.01	0.00	0.01
Extended parent–child conversations	–	–	0.00	0.03	0.01	0.03
Joint cultural activities	–	–	0.01	0.04	–0.01	0.03
Constant	4.20***	0.45	4.12***	0.45	3.69***	0.43
Adjusted R^2	0.12		0.15		0.23	

Controls: students' age, gender, migration background, federal state, type of secondary school

Data: NEPS-SC3, $N = 2959$, multiple imputed data (m = 50); + $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$; weighted and unstandardized regression coeffcients; own calculations. *SE* standard error

where children become increasingly independent, as parents may intervene directly only if they see a need to do so.

Hypothesis 3, suggesting a positive effect of educationally beneficial parental practices on the final GPA, was supported only for educational and cultural dialogue. Regarding the difference in statistical significance for the first outcome, it could be possible that facilitating understanding is critical for achieving certain educational milestones, such as attaining the *Abitur*, but is less influential in shaping more nuanced academic outcomes, such as GPA.

When we controlled for basic cognitive skills, reading, and mathematics in grade 5 (model 3), we saw broadly the same pattern as in the first multivariate analysis. The effect sizes of parental education and educational and cultural dialogue practices decreased, although they remained statistically significant.

In line with hypothesis 4, which proposes that the effects of parental education are mediated by parental practices, the statistically significant positive effect of parents with high education decreases from 0.229 to 0.215 when all practices were included in the model (model 1 vs. model 2). However, although there was a slight reduction, it is so minimal that it is unlikely to indicate a notable mediating effect of parental practices in a practical way.

6 Conclusion and Discussion

The aim of this study was to investigate the relationship between social origin and academic success at the end of upper secondary school by relating parental education to parental practices during lower secondary schooling. For the first time in Germany, we have examined the importance of a broader set of parental practices for educational inequality at the end of upper secondary schooling with longitudinal data, examining their association with three indicators of educational success: attaining an upper secondary school–leaving certificate (*Abitur*), competencies in reading and mathematics, and the final GPA of the *Abitur*.

Overall, our findings underscore the persistent influence of social origin on educational outcomes, even at this comparatively late and already selective stage of the educational career. Across all models, parental education remains associated with educational attainment, competencies, and grades, even after controlling for sociodemographic characteristics and aspects such as path dependencies resulting from different school tracks and prior performance. The relatively small but consistent effect sizes indicate that mechanisms of social inequality continue to operate throughout secondary education.

Regarding parental practices, our results indicate two main findings. First, some parental practices show small but statistically signifcant associations with educational outcomes. Second, however, these practices appear to contribute, if at all, only very marginally to explaining social inequalities in those educational outcomes in secondary education. We found that parental practices differed by social origin and that higher-educated parents engaged more often in educationally beneficial parental practices than lower-educated parents did. But contradicting our hypothesis, the consideration of parental practices in the OLS models leads to only very

minor reductions in the coeff cients for parental education, indicating that the extent to which they account for social inequalities in educational outcomes at this educational stage is very limited. Among the practices considered, educational and cultural dialogue between parents and children shows the most consistent associations with the attainment of the *Abitur*, competencies, and the f nal GPA. These associations are statistically signifcan t but relatively small. However, the data do not allow for causal claims. Further, our results are consistent with the interpretation that parental practices might inf uence students' grades through the improvement of their competencies. For example, the practice of educational and cultural dialogue shows a stronger association with reading competencies, which makes sense in terms of content, as it can be assumed that practices such as discussions about books are closer to topics relevant to German lessons and can infuence these outcomes more than for mathematics.

In general, this study also contributes to the theoretical debate, as our results suggest that it is not direct support, such as help in preparing presentations for class, which makes a bigger difference, but rather parental practices that involve discussion of educationally relevant topics. Bourdieu refers to this as *purposeless education*, which involves the unintended transmission of cultural capital. These exchanges help in developing an understanding of educational values and ways of thinking, which can have a lasting positive impact on academic achievement and educational attainment. In line with international research, our f ndings suggest that academic socialization practices especially show a positive effect. This is consistent with research on parental involvement, which suggests that parental practices have a positive effect when they provide a structured learning environment and promote self-regulated learning behaviors.

There are several limitations to our study: The small effect sizes suggest that many processes contributing to educational inequality occur earlier, long before lower secondary school. Contrary to our theoretical assumptions, we did not f nd positive relationships with all practices, and the mediating contribution of parental practices is much smaller than theorized. Data limitations due to only a few measurements of parental practices in the NEPS and their temporal distance to our outcome could account for that. It is also possible that practices such as direct support are reactions to poor grades, which could explain why the relationship appears negative or indifferent. It should also be noted that the association between educational and cultural dialogue and educational outcomes may depend on whether such dialogues are primarily initiated by parents or by their children. Regardless of this, the general willingness and ability of parents to engage in such conversations, and to show openness and interest, is likely to contribute to an educationally benef cial setting. Ideally, we would have liked to include more precise and more frequent measurements and to include more information about parental practices. Due to this rather limited set of information in the NEPS, we have to assume that the information we have serves as a good proxy for how parents behave in general over longer periods of time. Since the relevance of specif c parental practices may change throughout the educational career, and since the practices available in our data lack the level of detail provided by in-depth qualitative studies, it is likely that our analyses capture only a limited part of the overall impact of parental practices. Another important

issue is linked to the early school tracking in the German educational system and available data. Parents have already *set the course* for the educational success of their children through earlier practices in primary school and before. Although we controlled for the initial competencies at the beginning of grade 5 and can thus show the *added value* of social origin effects in secondary school, these initial competencies (measured at the age of around 11) are already the result of social inequality that has already taken place so far. On top of this, path dependencies are established early on and strongly influence the educational trajectory, as seen in the finding that the type of secondary school is strongly related to the probability of achieving the *Abitur*, accounting for half of the explained variance. Moreover, it is comparatively difficult to adequately capture the subtle and diffuse practices that constantly take place in everyday life with brief survey instruments. Also, the measurement of practices was limited to the quantity rather than the quality of the practices (e.g., frequently buying low-quality materials may be less helpful than buying a limited number of very specific and exclusive materials). Regarding the generalizability of the results, we can assume that even the group of lower-educated parents in the panel was already positively selected; thus, existing effects in the overall population might be underestimated.

On the one hand, the results show that even in the teenage years, parental practices still play a role in school achievement, and effects of social origin can also be found here, although probably at a much lower level than in the early stages of education. Therefore, analyses that focus on all effects of social origin—including their mechanisms—could be promising for further educational research. On the other hand, the results suggest that in secondary schooling, educationally relevant parental practices are characterized by providing children with ongoing guidance and by engaging them in conversations that highlight the value of education and culturally relevant topics in modern life. For example, parents can discuss current topics, books, or social issues and connect school content to everyday experiences. Such open-ended conversations might help children develop argumentative and reflective skills. While such parental practices could be beneficial, their overall importance during the secondary school phase appears limited. This supports the broader view within the research community that policies and interventions aiming to reduce educational inequality need to start early to be most effective.

Considering the still not fully explained effect of social origin, and given that in-depth qualitative studies especially find relevant connections (e.g., Sari 2026), we advocate for further research on parental practices. It would be desirable for further research to have multiple measurement points of parental practices. This would allow for more longitudinal analyses and provide a clearer understanding of the causal relationships. Moreover, aligning survey instruments more closely with Bourdieu's theory could be particularly fruitful. Based on Bourdieu's ideas, promising more detailed parental practices could, for example, include supporting linguistic and argumentation skills, facilitating cultural experiences with opportunities for in-depth reflection, and providing strategic guidance for navigating the educational system.

7 Appendix

Table 6 Overview of the question texts

Practices	Question text from the survey	Response scale
Extended parent–child conversations (G7; P)	*In the last 12 months, how often have you had longer conversations with <target child's name>, for example about school or certain topics which move and interest you?*	1–7
Joint cultural activities (G7; P)	*In the past 12 months, how often have you visited a museum or exhibition with <name of target child>, e.g. natural history museum, hands-on exhibition, gallery or similar?*	1–7
Facilitating understanding (G8, S)	*How is homework handled in your home?*	–
	If I can't manage my homework on my own, my parents always make time for me	1–4
	If I don't understand something in class, I can talk to my parents about it	1–4
	My parents don't want me to learn things just by heart, but to really understand it	1–4
Direct support (G8, S)	*The following questions are about how often your parents support you with school matters*	–
	How often do your parents buy you additional learning materials or books to help you study?	1–4
	How often do your parents help you with recitations or presentations for class?	1–4
	How often do your parents talk to you about topics that are discussed in class?	1–4
	How often do your parents talk to you about problems in school?	1–4
Educational and cultural dialogue (G9, S)	*How often does it normally happen that you talk with your mother or father about books?*	1–5
	How often does it normally happen that you talk with your mother or father about works of art or art in general?	1–5
	How often does it normally happen that you talk with your mother or father about political or social issues?	1–5
	How important are the following sources of information for your career choice? Advice from parents	1–4

Questions were asked to students (= S), to parents (= P)
G7–G9 grades 7–9

Table 7 Descriptive statistics of the complete sample of secondary school students ($N = 5048$)

Variables			
Metric variables	**Range**	**Mean (standard deviation)**	**Share of missing data**
Age at the beginning of grade 12 (in years)	13.00–19.41	16.38 (0.53)	0.00
Facilitating understanding	–3.50–0.50	–0.02 (1.02)	0.13
Direct support	–2.88–0.70	–0.01 (1.00)	0.15
Educational and cultural dialogue	–2.50–1.41	–0.02 (1.00)	0.23
Competency in reading grade 5	–4.60–4.07	–0.04 (1.25)	0.32
Competency in mathematics grade 5	–4.70–4.03	–0.02 (1.16)	0.32
Cognitive skill, perceptual speed grade 5	0–93	43.90 (13.37)	0.32
Cognitive skill, reasoning grade 5	1–12	6.86 (2.62)	0.32
Categorical variables	**Categories**	**Share**	**Share of missing data**
Attainment of the Abitur	1 = yes	0.58	0.00
Parental education	1–3	–	0.27
Low education/intermediate education		0.46	
Higher education eligibility *Abitur*		0.22	
University education		0.32	
Female	1 = yes	0.52	0.00
Migration background	1 = yes	0.24	0.27
Extended parent–child conversations	1 = yes	0.81	0.35
Joint cultural activities	1 = yes	0.87	0.00
Type of secondary school in grade 6	1–3	–	0.30
Gymnasium		0.41	
School without track (yet)		0.17	
School for basic secondary education/intermediate Secondary school/school with several educational programs		0.42	
Type of secondary school in grade 10	1–4	–	0.12
Gymnasium		0.42	
Comprehensive or integrated secondary school		0.11	
School for basic secondary education/intermediate secondary school/school with several educational programs up to grade 10		0.45	
Left school before grade 10		0.03	

Table 7 (Continued)

Variables			
Type of secondary school in grade 12	1–4	–	0.44
Gymnasium		0.45	
Specialized/vocational Gymnasium		0.13	
Comprehensive school		0.16	
Other vocational school		0.25	
Federal state	1–16	–	0.00
Schleswig-Holstein		0.05	
Hamburg		0.02	
Niedersachsen		0.10	
Bremen		0.01	
Nordrhein-Westfalen		0.20	
Hessen		0.06	
Rheinland-Pfalz		0.04	
Baden-Württemberg		0.16	
Bayern		0.15	
Saarland		0.01	
Berlin		0.02	
Brandenburg		0.09	
Mecklenburg-Vorpommern		0.02	
Sachsen		0.02	
Sachsen-Anhalt		0.01	
Thüringen		0.03	

Table 8 Descriptive statistics of students attaining the *Abitur* ($N = 2959$)

Variables			
Metric variables	**Range**	**Mean (standard deviation)**	**Share of missing data**
Age at the beginning of grade 12 (in years)	14.17–18.33	16.23 (0.43)	0.00
Facilitating understanding	–3.50–0.50	0.11 (1.02)	0.09
Direct support	–2.88–0.70	0.02 (0.97)	0.11
Educational and cultural dialogue	–2.50–1.41	0.14 (0.98)	0.17
Competency in reading grade 5	–4.59–4.07	0.52 (1.18)	0.30
Competency in mathematics grade 5	–4.70–4.03	0.52 (1.06)	0.30
Cognitive skill, perceptual speed grade 5	0–93	45.06 (13.38)	0.30

Table 8 (Continued)

Variables			
Cognitive skill, reasoning grade 5	0–12	7.73 (2.34)	0.30
Competency in reading grade 12	–3.56–3.91	0.28 (0.85)	0.26
Competency in mathematics grade 12	–4.35–4.23	0.27 (1.04)	0.24
Abitur grade (final GPA)	0.8–4.3	2.34 (0.63)	0.03
Categorical variables	**Categories**	**Share**	**Share of missing data**
Parental education	1–3	–	0.21
Low education/intermediate education		0.29	
Higher education eligibility *Abitur*		0.23	
University education		0.48	
Female	1 = yes	0.53	0.00
Migration background	1 = yes	0.29	0.21
Extended parent–child conversations	1 = yes	0.81	0.27
Joint cultural activities	1 = yes	0.89	0.00
Type of secondary school in grade 6	1–3	–	0.27
Gymnasium		0.65	
School without track (yet)		0.15	
School for basic secondary education/intermediate secondary school/school with several educational programs		0.20	
Type of secondary school in grade 10	1–4	–	0.07
Gymnasium		0.69	
Comprehensive or integrated secondary school		0.09	
School for basic secondary education/intermediate secondary school/school with several educational programs up to grade 10		0.22	
Left school before grade 10		0.02	
Type of secondary school in grade 12	1–4	–	0.05
Gymnasium		0.66	
Specialized/vocational Gymnasium		0.10	
Comprehensive school		0.10	
Other vocational school		0.14	
Detailed federal state distribution left out due to data usage conditions	*1–16*	–	*0.00*

Table 9 Determinants of students' attainment of the *Abitur* according to multivariate linear regression models (*OLS*)—with controls

Model (M)	M1 Control variables		M2 Control variables + parental practices		M3 Full model (M2 + skills/ competencies in grade 5)	
	Coeffc ient	SE	Coeffc ient	SE	Coeffc ient	SE
Parental education						
Low and intermediate education	Reference		Reference		Reference	
Higher education eligibility *Abitur*	0.09***	0.02	0.08***	0.02	0.08***	0.02
University degree	0.16***	0.02	0.15***	0.02	0.13***	0.02
Female	0.05***	0.01	0.05***	0.01	0.06***	0.01
Migration background	–0.03^{+}	0.02	–0.03	0.02	0.00	0.02
Age at the beginning of grade 12	–0.09***	0.01	–0.09***	0.01	–0.07***	0.01
Type of secondary school in grade 6						
Gymnasium	Reference		Reference		Reference	
School without track (yet)	–0.03	0.03	–0.03	0.03	0.01	0.03
School for basic secondary education/intermediate secondary school/school with several educational programs	–0.09**	0.03	–0.09**	0.03	–0.05^{+}	0.03
Type of secondary school in grade 10						
Gymnasium	Reference		Reference		Reference	
Comprehensive or integrated secondary school	–0.26*	0.12	–0.25*	0.12	–0.24*	0.12
School for basic secondary education/intermediate secondary school/school with several educational programs up to grade 10	–0.43***	0.11	–0.43***	0.11	–0.40***	0.10
Left school before grade 10	–0.61***	0.08	–0.60***	0.08	–0.53***	0.07
Type of secondary school in grade 12						
Gymnasium	Reference		Reference		Reference	
Specialized/vocational Gymnasium	0.02	0.07	0.02	0.07	0.04	0.07
Comprehensive school	–0.09	0.17	–0.09	0.16	–0.06	0.16
Other vocational school	–0.05	0.20	–0.05	0.19	–0.02	0.19
Competency in reading grade 5	–	–	–	–	0.03***	0.01

Table 9 (Continued)

Model (M)	M1		M2		M3	
	Control variables		Control variables + parental practices		Full model (M2 + skills/ competencies in grade 5)	
	Coeffc ient	SE	Coeffc ient	SE	Coeffc ient	SE
Competency in mathematics grade 5	–	–	–	–	0.04***	0.01
Cognitive skill, perceptual speed grade 5	–	–	–	–	0.00	0.00
Cognitive skill, reasoning grade 5	–	–	–	–	0.01**	0.00
Extended parent–child conversations	–	–	0.00	0.02	0.00	0.02
Joint cultural activities	–	–	0.00	0.02	–0.01	0.02
Facilitating understanding	–	–	0.02**	0.01	0.02*	0.01
Direct support	–	–	–0.01	0.01	0.00	0.01
Educational and cultural dialogue	–	–	0.03***	0.01	0.02***	0.01
Constant	2.28***	0.20	2.24***	0.20	1.85***	0.18
Adjusted R^2	0.51		0.51		0.53	

Data: NEPS-SC 3, $N = 5048$, multiple imputed data (m = 50); + $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$; weighted and unstandardized regression coeffc ients; own calculations. Note: We also controlled for federal state, which is not shown here. *SE* standard error

Table 10 Determinants of students' reading and mathematics competencies according to multivariate linear regression models (OLS)—with controls

Competencies in grade 12	Reading						Mathematics					
Model (M)	M1		M2		M3		M1		M2		M3	
	Control variables		Control variables + parental practices		Full model (M2 + skills/ competencies in grade 5)		Control variables		Control variables + parental practices		Full model (M2 + skills/competencies in grade 5)	
	Coeffc ient	SE	Coeffc ient	SE	Coeffc ient	SE	Coeffc ient	SE	Coeffc ient	SE	Coeffc ient	SE
Parental education												
Low and intermediate education	Reference		Reference		Reference		Reference		Reference		Reference	
Higher education eligibility *Abitur*	0.12*	0.05	0.11*	0.05	0.09*	0.04	0.08	0.05	0.07	0.05	0.04	0.05
University degree	0.16***	0.04	0.14**	0.04	0.05	0.04	0.22***	0.05	0.20***	0.05	0.11*	0.04
Female	0.12***	0.03	0.10**	0.03	0.16***	0.03	–0.51***	0.04	–0.52***	0.04	–0.36***	0.04
Migration background	–0.21***	0.05	–0.21***	0.05	–0.07+	0.04	–0.29***	0.06	–0.29***	0.06	–0.11*	0.05
Age at the beginning of grade 12	–0.14***	0.04	–0.13***	0.04	–0.11**	0.04	–0.24***	0.05	–0.23***	0.05	–0.20***	0.04
Type of secondary school grade 6												
Gymnasium	Reference		Reference		Reference		Reference		Reference		Reference	
School without track (yet)	0.06	0.08	0.05	0.08	0.21**	0.07	–0.09	0.09	–0.11	0.09	0.11	0.08
School for basic secondary education/intermediate secondary school/school with several educational programs	–0.00	0.09	–0.01	0.09	0.09	0.08	–0.05	0.10	–0.06	0.10	0.08	0.09
Type of secondary school grade 10												

Table 10 (Continued)

Competencies in grade 12	Reading						Mathematics					
Model (M)	M1		M2		M3		M1		M2		M3	
	Control variables		Control variables + parental practices		Full model (M2 + skills/competencies in grade 5)		Control variables		Control variables + parental practices		Full model (M2 + skills/competencies in grade 5)	
	Coeffc ient	SE	Coeffc ient	SE	Coeffc ient	SE	Coeffc ient	SE	Coeffc ient	SE	Coeffc ient	SE
Gymnasium	Reference		Reference		Reference		Reference		Reference		Reference	
Comprehensive or integrated secondary school	–0.21*	0.10	–0.21*	0.10	–0.17+	0.09	–0.02	0.11	–0.01	0.11	0.05	0.10
School for basic secondary education/intermediate secondary school/school with several educational programs up to grade 10	–0.22*	0.10	–0.22*	0.10	–0.11	0.08	–0.13	0.10	–0.12	0.10	0.01	0.09
Left school before grade 10	–0.12	0.52	–0.12	0.52	–0.01	0.50	–0.03	0.57	–0.02	0.56	0.05	0.44
Type of secondary school grade 12												
Gymnasium	Reference		Reference		Reference		Reference		Reference		Reference	
Specialized/vocational Gymnasium	–0.17**	0.06	–0.15*	0.06	–0.03	0.06	–0.28***	0.08	–0.27***	0.08	–0.10	0.07
Comprehensive school	–0.19*	0.08	–0.18*	0.08	–0.07	0.07	–0.37***	0.09	–0.36***	0.09	–0.20*	0.09
Other vocational school	–0.43***	0.08	–0.41***	0.08	–0.19**	0.07	–0.48***	0.08	–0.47***	0.08	–0.20**	0.07
Competency in reading grade 5	–	–	–	–	0.25***	0.02	–	–	–	–	0.08***	0.02

Table 10 (Continued)

Competencies in grade 12	Reading						Mathematics					
Model (M)	M1		M2		M3		M1		M2		M3	
	Control variables		Control variables + parental practices		Full model (M2 + skills/ competencies in grade 5)		Control variables		Control variables + parental practices		Full model (M2 + skills/competencies in grade 5)	
	Coeffc ient	SE	Coeffc ient	SE	Coeffc ient	SE	Coeffc ient	SE	Coeffc ient	SE	Coeffc ient	SE
Competency in mathematics grade 5	–	–	–	–	0.16***	0.02	–	–	–	–	0.38***	0.02
Cognitive skill, perceptual speed grade 5	–	–	–	–	–0.00	0.00	–	–	–	–	–0.00	0.00
Cognitive skill, reasoning grade 5	–	–	–	–	0.02*	0.01	–	–	–	–	0.05***	0.01
Extended parent–child conversations	–	–	0.01	0.04	0.03	0.04	–	–	–0.01	0.05	–0.00	0.05
Joint cultural activities	–	–	0.05	0.05	0.00	0.04	–	–	0.00	0.06	–0.03	0.05
Facilitating understanding	–	–	0.04+	0.02	0.03	0.02	–	–	0.07**	0.02	0.04*	0.02
Direct support	–	–	–0.07***	0.02	–0.01	0.02	–	–	–0.10***	0.02	–0.03+	0.02
Educational and cultural dialogue	–	–	0.10***	0.02	0.06***	0.02	–	–	0.06**	0.02	0.02	0.02
Constant	2.60***	0.62	2.44***	0.62	1.75**	0.58	4.51***	0.77	4.45***	0.77	3.27***	0.68
Adjusted R^2	0.16		0.19		0.34		0.27		0.28		0.47	

Data: NEPS-SC 3, $N = 2959$, multiple imputed data (m = 50); + $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$; weighted and unstandardized regression coeffcients ; own calculations. Note: We also controlled for federal state, which is not shown here. *SE* standard error

Table 11 Determinants of students' grade point averages according to multivariate linear regression models (OLS)—with controls

Model (M)	M1 Control variables		M2 Control variables + parental practices		M3 Full model (M2 + skills/competencies in grade 5)	
	Coeffc ient	SE	Coeffc ient	SE	Coeffc ient	SE
Parental education						
Low and intermediate education	Reference		Reference		Reference	
Higher education eligibility *Abitur*	0.08*	0.03	0.07*	0.03	0.06^{+}	0.03
University degree	0.23***	0.03	0.22***	0.03	0.17***	0.03
Female	0.14***	0.02	0.13***	0.02	0.18***	0.02
Migration background	–0.13***	0.03	–0.13***	0.03	–0.05+	0.03
Age at the beginning of grade 12	–0.10***	0.03	–0.10***	0.03	–0.08**	0.03
Type of secondary school in grade 6						
Gymnasium	Reference		Reference		Reference	
School without track (yet)	0.02	0.06	0.01	0.06	0.10+	0.05
School for basic secondary education/intermediate secondary school/school with several educational programs	0.03	0.06	0.03	0.06	0.08	0.05
Type of secondary school in grade 10						
Gymnasium	Reference		Reference		Reference	
Comprehensive or integrated secondary school	–0.13+	0.07	–0.13+	0.07	–0.09	0.06
School for basic secondary education/intermediate secondary school/school with several educational programs up to grade 10	–0.18**	0.06	–0.18**	0.06	–0.11+	0.06
Left school before grade 10	–0.26	0.23	–0.26	0.23	–0.21	0.27

Table 11 (Continued)

Model (M)	M1 Control variables		M2 Control variables + parental practices		M3 Full model (M2 + skills/competencies in grade 5)	
	Coeffc ient	SE	Coeffc ient	SE	Coeffc ient	SE
Type of secondary school in grade 12						
Gymnasium	Reference		Reference		Reference	
Specialized/vocational Gymnasium	–0.02	0.05	–0.01	0.05	0.07	0.05
Comprehensive school	–0.04	0.05	–0.03	0.05	0.03	0.05
Other vocational school	–0.12*	0.05	–0.11*	0.05	0.01	0.05
Competency in reading grade 5	–	–	–	–	0.11***	0.01
Competency in mathematics grade 5	–	–	–	–	0.13***	0.02
Cognitive skill, perceptual speed grade 5	–	–	–	–	0.00	0.00
Cognitive skill, reasoning grade 5	–	–	–	–	0.00	0.01
Extended parent–child conversations	–	–	0.00	0.03	0.01	0.03
Joint cultural activities	–	–	0.01	0.04	–0.01	0.03
Facilitating understanding	–	–	0.03^{+}	0.02	0.02	0.01
Direct support	–	–	–0.03*	0.01	0.00	0.01
Educational and cultural dialogue	–	–	0.06***	0.01	0.04**	0.01
Constant	4.20***	0.45	4.12***	0.45	3.69***	0.43
Adjusted R^2	0.12		0.15		0.23	

Data: NEPS-SC 3, $N = 2959$, multiple imputed data (m = 50); + $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$; weighted and unstandardized regression coeffcients; own calculations. Note: We also controlled for federal state, which is not shown here. *SE* standard error

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Elif Sari 1992, M.A. Sociology, Recipient of a doctoral completion scholarship from the Bamberg Graduate School of Social Sciences (BAGSS), University of Bamberg; until recently research assistant at the Leibniz Institute for Educational Trajectories (LIfBi), Bamberg. Fields of research: Social and educational inequality, parental practices and mixed methods research. Publications: Knowing when it's 'necessary'—academic parents' strategic intervention and involvement: How parents guide and support their teenage children in specifc situations in upper secondary education. *British Journal of Sociology of Education*, 47(1), 158–174, 2026.

Christoph Homuth 1982, Dr. rer. pol., Head of Working Group Educational Decisions and Social Inequality at the Leibniz Institute for Educational Trajectories, Bamberg. Fields of research: Sociology of education, social stratif cation and inequality, survey methodology. Publications: *Die G8-Reform in Deutschland: Auswirkungen auf Schülerleistungen und Bildungsungleichheit*, Wiesbaden 2017.