



**Passing on educational advantages**  
The role of cultural capital and  
concerted cultivation

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**Karoline Mikus**  
aus Höxter

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1. Betreuerin: PD Dr. Nicole Tieben
2. Betreuerin: Prof. Dr. Pia S. Schober

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Dekan: Prof. Dr. Josef Schmid

1. Gutachterin: PD Dr. Nicole Tieben
2. Gutachterin: Prof. Dr. Pia S. Schober
3. Gutachter: Prof. Dr. Herman G. van de Werfhorst



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## SUMMARY

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This dissertation thesis is dedicated to explaining the emergence of differences in educational competencies and performance by socio-economic background. Based on Bourdieu's cultural reproduction theory and Lareau's concept of concerted cultivation, a theoretical framework was developed that describes the mechanisms through which parental socio-economic status is related to children's educational success. Inspired by Jæger's (2009) reformulation of the cultural reproduction theory, this framework differentiates between two consecutive processes: cultural capital transmission and cultural capital conversion. While the association between cultural capital and academic success has been found in multiple studies, the processes of transmission and conversion of cultural capital remains blurred. To remove some of the opaqueness in these processes, the following two overarching research questions were examined by three empirical studies: (1) How do parents transmit their cultural capital to their children and activate their cultural capital to secure educational advantages for their children? and (2) How is children's cultural capital converted into educational success?

To answer the first question, two studies in the context of early childhood were conducted using data of the Starting Cohort 2 of the German National Educational Panel Study (NEPS). The *first* study examined how parents with a high socio-economic status actively try to transmit their cultural capital to their children and how this explains differ-



ences in academic competencies. Based on Lareau's (2003) concept of concerted cultivation, the study examined if parents with a high socio-economic status trigger their children's cognitive skill development by enrolling them into organized leisure activities and providing cognitive stimulation at home. While plenty of research exists on the role of parental cognitive stimulation during early childhood, little is known about the benefits of young children's enrollment into organized leisure activities. The results of logistic regression analyses suggest that 5-year olds are more likely to be enrolled in organized leisure activities (here: sports and music) when their family has a high socio-economic status. However, only parent-child reading, as one out of five forms of parental cognitive stimulation at home, was significantly positively related to parental socio-economic status. Furthermore, the mediation analysis showed that only children's participation in organized music activities explained a modest portion of the skill gap in reasoning and math skills by socio-economic background. Hence, this study suggests that some but not all parenting strategies of parents with a high socio-economic status lead to their children's cognitive skill growth and thereby successfully contribute to the transmission of cultural capital.

The second study examined to which extent parents themselves convert their cultural capital into educational advantages for their children via parent-teacher contact. In contrast to the majority of the research on parent-teacher contact in school, this study focused on parent-teacher contact in the context of childcare centers. Moreover, not only parental predictors but also predictors of the institution and teachers were examined. The results of an ordinal regression analysis suggest that in contrast to common stereotypes and previous research

in the school context, parents with a high socio-economic status were significantly less likely to have frequent conversations with childcare teachers. Moreover, the results showed that parent-teacher contact is also influenced by an institutional openness for parental involvement and children's characteristics. Overall, the findings suggest that in the context of German early childcare, parent-teacher contact does not seem to be a strategy of parents with high socio-economic status to secure their children's advantages. Therefore, parents' conversion and enactment of their cultural capital must take place through other mechanisms.

In the third paper, the focus was on the second research question concerning the conversion of children's cultural capital in the context of secondary school. Several researchers postulate that cultural capital relates to educational success not only via symbolizing academic brilliance but also because it directly stimulates children's skill growth. However, prior research has often neglected the interaction between these two conversion mechanisms with the examined dimension of cultural capital. Using data of the NEPS Starting Cohort 3, this study examined if the major mechanisms through which cultural capital of children relates to academic outcomes depends on the studied dimension of cultural capital. The results of the structural equation model showed that the skill-generating dimension of cultural capital (here: children's reading) was mainly associated with children's standardized reading test scores. In contrast, the symbolic dimension of cultural capital (here: children's beaux-arts participation) was only related to a teacher's subjective performance evaluation (here: school grades) but not to children's standardized reading test scores. In sum, this

study suggests that children's cultural capital channels through both mechanisms into high academic outcomes, and which mechanism is observed depends on the cultural capital dimension at hand.

## ZUSAMMENFASSUNG

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Diese Dissertation widmet sich der Erklärung von Unterschieden in schulischen Kompetenzen und Leistungen zwischen Kindern unterschiedlicher sozialer Herkunft. Basierend auf Bourdieu's Theorie der kulturellen Reproduktion und Lareau's Konzept der „gezielten Kultivierung“ wurde ein theoretisches Rahmenmodell entwickelt, welches die Mechanismen beschreibt, durch die der sozioökonomische Status der Eltern mit dem Bildungserfolg der Kinder zusammenhängt. Inspiriert von der Neuformulierung der Kulturreproduktionstheorie durch Jæger (2009) unterscheidet dieses theoretische Modell zwischen zwei aufeinander folgenden Prozessen: der Übertragung von Kulturkapital und der Umwandlung von Kulturkapital. Während in vielen Studien der Zusammenhang zwischen kulturellem Kapital und akademischem Erfolg festgestellt wurde, bleiben die Prozesse der Übertragung und Umwandlung von kulturellem Kapital verhältnismäßig wenig erforscht. Um diese Prozesse besser zu verstehen, wurden die folgenden zwei übergreifenden Forschungsfragen in drei empirischen Studien untersucht: (1) Wie übertragen Eltern ihr kulturelles Kapital auf ihre Kinder und aktivieren ihr kulturelles Kapital, um ihren Kindern Bildungsvorteile zu sichern? (2) Wie wird das Kulturkapital von Kindern in Bildungserfolg umgewandelt?

Zur Beantwortung der ersten Frage wurden zwei Studien im Kontext der frühen Kindheit mit den Daten der Startkohorte 2 des Na-

tionalen Bildungspanels (NEPS) durchgeführt. In der ersten Studie wurde untersucht, wie Eltern mit einem höheren sozioökonomischen Status aktiv versuchen, ihr kulturelles Kapital an ihre Kinder weiterzugeben, und ob dies Unterschiede in der schulischen Leistung erklärt. Basierend auf dem Konzept der „gezielten Kultivierung“ von Lareau (2003) wurde untersucht, ob Eltern mit einem höheren sozioökonomischen Status bei ihren Kindern die Entwicklung kognitiver Fähigkeiten stimulieren, indem sie ihre Kinder in organisierte Freizeitaktivitäten schicken und zu Hause kognitive stimulierende Aktivitäten mit ihnen machen. Zwar gibt es zahlreiche Untersuchungen zur Rolle von einer kognitiv stimulierenden häuslichen Umgebung in der frühkindlichen Entwicklung, aber über die Vorteile von organisierte Freizeitaktivitäten für junge Kinder ist jedoch noch wenig bekannt. Die Ergebnisse logistischer Regressionsanalysen legen nahe, dass der sozioökonomische Status der Eltern mit der Teilnahme an organisierte Freizeitaktivitäten von Kindern (hier: Sport, Musik und andere organisierte Aktivitäten) im Alter von fünf Jahren positiv zusammenhängt. Allerdings war nur das Lesen der Eltern mit ihren Kindern als eine von fünf Formen der kognitiven Stimulation der Eltern zu Hause signifikant positiv mit dem sozioökonomischen Status der Eltern verbunden. Darüber hinaus zeigte die Mediationsanalyse, dass die Teilnahme von Kindern an organisierten Musikaktivitäten einen geringen Teil der Kompetenzlücke zwischen Kindern unterschiedlicher sozioökonomischer Herkunft in Bezug auf logisches Denken und Mathematik erklärt. Zusammengefasst zeigt die Studie, dass einige, aber nicht alle Erziehungsstrategien von Eltern mit hohem sozioökonomischen Status zu einem Wachstum der kognitiven Fähigkeiten ihrer

Kinder führen und damit zur Übertragung von kulturellem Kapital beitragen.

In der zweiten Studie wurde untersucht, inwieweit Eltern ihr kulturelles Kapital über ihren Kontakt mit den Erzieher\*innen in Bildungsvorteile ihrer Kinder umwandeln. Im Gegensatz zu den meisten Untersuchungen zum Kontakt zwischen Eltern und Bildungsinstitutionen, die im Kontext Schule stattfanden, konzentrierte sich diese Studie auf den Kontakt zwischen Eltern und Kindertagesstätten. Darüber hinaus wurden nicht nur elterliche Prädiktoren, sondern auch Prädiktoren der Einrichtung und der Erzieher\*in untersucht. Die Ergebnisse einer ordinalen Regressionsanalyse zeigen, dass Eltern mit einem höheren sozioökonomischen Status im Gegensatz zu gängigen Stereotypen und früheren Untersuchungen im schulischen Kontext mit signifikant geringerer Wahrscheinlichkeit häufiger Gespräche mit Erzieher\*innen führen. Darüber hinaus zeigten die Ergebnisse, dass der Kontakt zwischen Eltern und Erzieher\*innen auch durch die allgemeine Offenheit der Institution bezüglich der Beteiligung von Eltern und durch Merkmale der Kinder beeinflusst wird. Insgesamt deuten die Ergebnisse darauf hin, dass der Kontakt zwischen Eltern und Erzieher\*innen im Kontext der deutschen frühkindlichen Kinderbetreuung keine gezielte Strategie von Eltern mit höherem sozioökonomischen Status zu sein scheint, um ihren Kindern gewisse Vorteile zu sichern. Die Umwandlung und Aktivierung von elterlichem Kulturkapital muss folglich über andere Mechanismen erfolgen.

Im dritten Beitrag lag der Schwerpunkt auf der zweiten Forschungsfrage bezüglich der Umwandlung des Kulturkapitals von Kindern im Kontext der Sekundarschule. Anhand von Daten der NEPS Startko-

horte 3 wurde in dieser Studie geprüft, ob die zentralen Mechanismen, durch die das Kulturkapital von Kindern mit dem akademischen Erfolg zusammenhängt, von der untersuchten Dimension des Kulturkapitals abhängen. Einige Forscher postulieren, dass kulturelles Kapital nicht nur durch einen symbolischen Effekt mit dem Bildungserfolg zusammenhängt, sondern auch, dass es direkt das Kompetenzzwachstum von Kindern stimuliert. Bisherige Forschungen haben jedoch häufig die Wechselwirkung zwischen diesen beiden Umwandlungsmechanismen und der untersuchten Dimension des Kulturkapitals vernachlässigt. Die Ergebnisse des Strukturgleichungsmodells zeigten allerdings, dass die kompetenzgenerierende Dimension des Kulturkapitals (hier: Lesehäufigkeit von Kindern) hauptsächlich mit standardisierten Testergebnissen der Lesefähigkeiten von Kindern in Verbindung steht. Im Gegensatz dazu hing die symbolische Dimension des Kulturkapitals (hier: Beteiligung der Kinder an Beaux-Arts) nur mit den subjektiven Leistungsbewertungen der Lehrer (hier: Schulnoten) zusammen, nicht jedoch mit den objektiv gemessenen Lesefähigkeiten der Kinder. Zusammenfassend lässt diese Studie darauf schließen, dass das Kulturkapital von Kindern durch beide Mechanismen zum Bildungserfolg beiträgt. Welcher Mechanismus hauptsächlich aktiv ist, hängt von der jeweils betrachteten Dimension des Kulturkapitals ab.





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## GENERAL INTRODUCTION

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The positive relationship between parental socioeconomic status and children's educational outcomes is one of the most basic and consistent findings in social inequality research. (Ishida et al., 1995; Sirin, 2005; White, 1982; Wössmann, 2004). This relationship was found independent of the kind of family socioeconomic status indicator used (e.g., Bukodi & Goldthorpe, 2013). Furthermore, this relationship was found for different indicators of educational outcomes such as standardized test scores (e.g., Feinstein, 2003), grade-point averages (e.g., Björklund et al., 2003), or chosen educational tracks (e.g., Stocké, 2007a). Yet, the causal processes underlying the socio-economic gradient in educational outcomes are not fully understood.

Sociologists and scholars from various disciplines have tried to uncover the many subtle ways through which this gradient evokes. Explanations range from genetics (e.g., Baier & Lang, 2019; Branigan et al., 2013; Guo & Stearns, 2002; Liu, 2018), home-environments (e.g., Anders et al., 2012; Davis-Kean, 2005; Kalil, 2015), to educational decisions (e.g., Jackson et al., 2007; Stocké, 2007a; Tieben, 2011). Several actors play a role in maintaining educational inequality from policies, institutions, and neighborhoods, to teachers, parents, peers, and to the child herself (Bronfenbrenner, 1979; Hasselhorn et al., 2015; Shavit

et al., 2007). From all these agents, the family provides the child with fundamental resources required for educational successes and therefore can be considered the most influential in explaining educational success (Alexander et al., 2007; Heckman, 2008; Parcel et al., 2010). Accordingly the family, as a key reproduction agent, is in the focus of this dissertation thesis.

According to Pierre Bourdieu—one of the most influential sociologists on social and educational reproduction—the concept of cultural capital is the solution for explaining the inter-generational transmission of educational (dis)advantages. In a nutshell, he argued that schools are middle-class institutions that act as gatekeepers and reward the possession of cultural capital. Cultural capital, however, is more common in higher socio-economic status families than lower socio-economic status families resulting in unequal chances for educational success based on socio-economic status. While an extensive amount of research has been done on the role of cultural capital in educational reproduction, the central processes of the transmission and conversion of cultural capital into educational success remain diffuse (Jæger, 2009). Therefore, this thesis is dedicated to explaining the emergence of social-class differences in educational competencies and performance using the concept of cultural capital. I aim to provide answers to two overarching research question from a theoretical and empirical perspective:

1. How do parents transmit their cultural capital to their children and activate their cultural capital to secure educational advantages for their children (in the context of early childhood)?



2. How is children's cultural capital converted into high educational performance (in the context of school)?

Providing answers to these questions allows us to better understand the two key processes of the cultural reproduction theory: the transmission of cultural capital and the conversion of cultural capital into educational advantages. Only if these pathways are well-understood, implications about a possible interruption of the inter-generational transmission of educational (dis)advantages can be derived.

To answer these questions, I supplement Bourdieu's theoretical ideas about cultural capital with those of Lareau (2003). She introduced the two concepts of "concerted cultivation" and "accomplishment of natural growth," which label two distinct parenting logics that differ between social classes and contribute to children's unequal cultural capital development. With her concepts, she theorized about the cultural capital transmission from parents to children and its conversion into educational success.

The first part of my contribution is the development of an integrated theoretical framework that describes the cultural mechanisms that lie between parental socio-economic status and children's educational performance; integrating Lareau's concepts of parenting logics within the broader frame of Bourdieu's cultural reproduction theory. The second part of my contribution are three empirical studies based on the German National Educational Panel Study (NEPS), which shed light on selected parts of the theoretical framework. Regarding the methodology, I followed the premise of "Let method be the servant, not the master" and applied a diverse set of statistical methods, suited

to the research questions, ranging from simple logistic regression to structural equation modeling.

The first and second study aimed to answer the first research question by investigating socio-economic differences in parental child-rearing logics and their consequences in the context of early childhood. Although Bourdieu emphasized early childhood socialization for the transmission of cultural capital, previous cultural capital research often had a focus on school children. The studies are based on the Starting Cohort 2 of the National Educational Panel Study (NEPS SC2) which includes rich data about 4-year-old children in German child-care centers (Kindergarten) and their parents, therefore addressing the gap investigating early childhood. In the first paper, the focus was on the concerted cultivation dimension of the organization of daily life and examined to what extent this form of concerted cultivation explains socio-economic differences in children's cognitive skills. The second paper focused on socio-economic differences in the concerted cultivation dimension of parent-teacher interaction.

After shedding light on the role of parental cultural capital transmission and conversion, in the third study, the focus was shifted to the context of school. Using the NEPS Starting Cohort 3, pathways through which fifth graders' own cultural capital is converted into educational success at school and how these conversion mechanisms depend on the dimension of cultural capital were analyzed. While this conversion is a crucial element of the cultural reproduction theory, there is still a dispute in cultural capital research about the underlying mechanisms.

Before describing these three empirical studies in depth, the thesis proceeds in the next section with a brief description of the overarching explanandum—educational inequality. In Chapter 2, I summarize theoretical arguments and previous research on cultural capital and concerted cultivation. Based on this, I derive an integrated theoretical framework that integrates Lareau’s concepts of concerted cultivation within the theory of cultural reproduction. I close this chapter with a short overview of the three empirical studies and their contribution to the field of cultural capital research. Then, in Chapters 3-5, I present the three studies. In Chapter 6, the final chapter, I summarize the major findings and limitations of my work and derive implications. I close this thesis with some general thoughts on promising avenues for further research on cultural capital and the social gradient in academic performance. Table 1.1 provides an overview of the chapters and the extent to which they are co-authored.

**Table 1.1:** Overview of chapters comprising the thesis, status and contribution in co-authored material

| Chapter | Authors   | Contribution of authors   | First author | Single Author | Status   |
|---------|---|---|--------------|---------------|--|
| 1-2     | Mikus, Karoline (KM)  |   | -            | yes           | -  |
| 3       | Mikus, Karoline;<br>Nicole Tieben (NT);<br>Schober, Pia S. (PS) | literature research (KM)<br>research idea & strategy (KM)<br>data preparation (KM)<br>statistical analyses (KM)<br>interpretation results (KM, PS, NT)<br>text writing & editing (KM, NT)         | yes          | no            | Published in RSSM<br>doi:10.1016/j.rssm.2020.100547    |
| 4       | Mikus, Karoline   |   | -            | yes           | Submitted  |
| 5       | Mikus, Karoline;<br>Nicole Tieben;<br>Schober, Pia S.           | literature research (KM, NT)<br>research idea & strategy (KM, NT)<br>data preparation (KM)<br>statistical analyses (KM)<br>interpretation results (KM, PS, NT)<br>text writing & editing (KM, NT) | yes          | no            | Published in BJSE<br>doi:10.1080/01425692.2019.1677454 |
| 6       | Mikus, Karoline   |   | -            | yes           | -  |

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## 1.1 DEFINITION AND EXTENT OF EDUCATIONAL INEQUALITY

Despite the well-known importance of education for an individual but also a society's welfare not every citizen has equal chances for educational success (Hanushek & Woessmann, 2010; OECD, 2010; Shavit & Blossfeld, 1993; Wössmann, 2004). The introduction of compulsory schooling and educational expansion has improved the broad access to education; however, the quality and quantity of education a child is receiving at home or in educational institutions often depends on ascribed characteristics such as social background (Attig & Weinert, 2020; Becker, 2006; Müller, 1998; Shavit et al., 2007; Stahl et al., 2018). This in turn is reflected in an association between an individual's social background and her educational outcomes, so called educational inequality.

While social background is an umbrella term for several factors such as religion, ethnicity, gender, or socio-economic status, I focus in this thesis on educational inequality by the latter one. As described in the introduction, a vast amount of research has demonstrated that parental socio-economic status is related to children's educational outcomes (OECD, 2019; Sirin, 2005; White, 1982; Wössmann, 2004). Although some researchers claim that this association has begun to weaken (Ballarino et al., 2009; Breen et al., 2009; De Graaf & Ganzeboom, 1993; Erikson & Jonsson, 1996; Henz & Maas, 1995; Marks, 2014; Müller & Haun, 1997; Vallet, 2004), this association still exists and is not likely to disappear in the near future (Gamoran, 2001; Ishida et al., 1995; Pfeffer, 2008; Shavit & Blossfeld, 1993; Shavit et al., 2007).

In particular, the German education system has been criticized to produce a comparatively strong association between parental socio-economic status and children's educational attainment and children's educational performance (Baumert & Schümer, 2001; Breen & Luijkx, 2004; Erikson & Goldthorpe, 1992; Hußmann et al., 2017; Klieme, 2010; Reiss et al., 2019; Van de Werfhorst, 2018). Although a decreasing socio-economic gradient in academic performance for German school children has been reported in the last years (Reiss et al., 2016), a recent national study shows that approximately 10 percent of the variance in German ninth graders' reading competence can still be attributed to parental socio-economic status (Stanat et al., 2016). Thus, while progress has been made to close the gap between social strata in the context of Germany, meaningful differences in educational outcomes remain and influence children's life chances.

Educational inequality is often discussed in the context of school. However, research suggests that the seeds of educational inequality are planted already before school (Anders et al., 2012; Bradbury et al., 2015; Bradley & Corwyn, 2002; Duncan et al., 1994; Feinstein, 2003; Heckman, 2008; Lee & Burkam, 2002). Previous research shows that children from families with a low socio-economic status have lower cognitive skills and noncognitive skills than their more advantaged counterparts (Garcia, 2015; Linberg et al., 2019). These cognitive and noncognitive skills represent essential preliminary skills for the development of academic skills and later school success (Cunha et al., 2010; Kautz et al., 2014). Indeed, a recent study based on German data by Skopek and Passaretta (2020) showed that socio-economic status gaps in achievement emerge and expand long before children enter

school. Hence, the study of educational inequality should not just begin once children enter school.

## 1.2 UNDERLYING MECHANISMS OF EDUCATIONAL INEQUALITY

To explain the mechanisms behind class differentials in educational attainment, Boudon (1974) introduced the notion of primary and secondary effects. Primary effects describe differences in academic performance and competencies by social class, while secondary effects describe differences in academic attainment by social class. Primary effects arise through differences in children's socialization environments and genetics (Goldthorpe, 1996). Secondary effects arise because educational decisions differ by social class despite children having equal performance (Becker, 2000; Breen & Goldthorpe, 1997).<sup>1</sup> While both effects have been shown to explain educational inequality (Ditton & Krüsken, 2006; Maaz & Nagy, 2010; Müller-Benedict, 2007; Stocké, 2007b), a large amount of the educational inequality research has focused on understanding secondary effects rather than primary effects. However, a recent study by Neugebauer et al. (2013) based on German data showed that at the transition from elementary to secondary school, children's academic performance (primary effect) was significantly more relevant for educational inequality than educational decisions (secondary effect). This implies that a reduction of primary effects plays a key role in reducing educational inequalities. To increase our sociological knowledge about the seeds from which educational

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<sup>1</sup> Some researchers argue that besides primary and secondary effects there exist tertiary effects. For the interested reader I recommend reading Helbig and Morar (2017) who wrote a discussion paper about tertiary effects.

(dis)advantages grow, this dissertation thesis focuses on the evolution of educational inequalities regarding educational performance (primary effects).

Research suggests that a child's educational performance is influenced by multiple factors which can be summarized into four broader dimensions (1) family, (2) individual characteristics, (3) educational institutions, and (4) neighborhood and peers (Hasselhorn et al., 2015). These dimensions of predictors are all embedded within specific societal circumstances and political contexts (Hasselhorn et al., 2015). Although the four dimensions represent important aspects that shape children's chances of educational success, I focus in this thesis mainly on explanations lying within the family and evolving within the standards of educational institutions. I do so because I conceptualize family social origin as a fundamental cause which affects and interacts with the other three dimensions (Jackson, n.d.; Kalil, 2015). Moreover, the famous Coleman Report has suggested that family rather than school environments explains most of the variation in children's educational performance (Coleman et al., 1966). Nevertheless, being aware of the multitude and complex interactions among predictors of children's educational performance, I will recognize the other socialization agents throughout this work, even they are not in the focus of the particular study.

Several theoretical approaches exist to study the evolution of primary effects due to family origin (e.g., Bourdieu, 1977; Conger & Elder, 1994; Eccles, 2007; Heckman, 2008; Lareau, 2003). These range from distal structural explanations (e.g., parental education and income) to more proximal process explanations (e.g., parenting style) (Feinstein et al.,



2008). In this thesis, I mainly rely on Bourdieu's (1977) cultural reproduction theory and Lareau's (2003) concept of "concerted cultivation." While Bourdieu's theory proposes an overarching explanation of how the reward system of schools ("rules of the game") is reproducing educational inequalities, Lareau's theoretical concept of concerted cultivation proposes an explanation of how higher social class parents train their children according to these rules and try to influence the referees of these rules to gain educational advantages for their children. Bourdieu's theory of cultural reproduction and Lareau's concept of concerted cultivation represent the core theoretical concepts for this thesis and will be described more in-depth in the next chapter.

# 2

## THEORETICAL AND EMPIRICAL BACKGROUND

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The theoretical background of this dissertation thesis is based on the two umbrella terms “cultural capital” and “concerted cultivation.” In the following sections, I will introduce these terms and summarize existing research. The chapter aims at making the reader familiar with the broader theoretical and empirical background in which the three subsequent empirical studies are embedded. A detailed theoretical and empirical background of each study can be found in Chapters 3 to 5. I close this chapter by summarizing current sociological knowledge and hypotheses about the evolution of primary effects within an integrated framework.

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**2.1 CULTURAL CAPITAL**

“The notion of cultural capital initially presented itself to me, in the course of research, as a theoretical hypothesis which made it possible to explain the unequal scholastic achievement of children originating from the different social classes by relating academic success, i.e., the specific profits which children from the different classes and class fractions can obtain in the academic market, to the distribution of cultural capital between the classes and class fractions.”

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*Pierre Bourdieu (1986:243)*

According to Bourdieu (1977, 1986) cultural capital plays a key role in the inter-generational transmission of educational advantages. The core argument of Bourdieu is that the advance in cultural capital allows families from higher social classes to ensure high educational outcomes for their offspring because the possession of cultural capital is rewarded in the school system (cultural reproduction). Children from families with a higher socio-economic status enter school in an advantaged position because they experience continuity between the culture of the home and the culture of the school. In contrast, children from families with a lower socio-economic status may lack cultural capital and feel alien in interactions with school authorities and out of place. Moreover, teachers may misinterpret cultural capital as academic brilliance, leading to upwardly biased evaluations of

children's academic performance. Hence, performance evaluations by teachers are not only based on true abilities but also on a cultural capital biased perception of the teacher. But what exactly is cultural capital?

### 2.1.1 *Definitions and understandings of cultural capital*

At the most general and abstract level, cultural capital can be understood as "cultural signals" of higher-social class membership (Lamont & Lareau, 1988). Bourdieu (1986) differentiated these cultural signals into three types of cultural capital: institutionalized, objectified, and embodied cultural capital. According to Lareau and Weininger's (2003) reading of Bourdieu, embodied capital consists of knowledge, skills, and competencies that become visible in a person's habitus.<sup>1</sup> It is transmitted passively during socialization and actively by maternal investments (Bourdieu, 1986). Since it cannot be transmitted instantaneously by gift or purchase, it can function as a form of symbolic capital (symbolizing higher social class membership). In contrast, objectified cultural capital, such as books or pieces of art, can be transmitted directly but requires embodied cultural capital (e.g., the ability to consume art) to be effective in its symbolic value (Bourdieu, 1968). Lastly, institutionalized capital is reflected and objectified in educa-

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<sup>1</sup> There are authors who argue that embodied cultural capital can be differentiated from habitus (Edgerton & Roberts, 2014) and Bourdieu's own writing about these to concepts is not entirely clear. Bourdieu (1986:244-45) wrote, "external wealth converted to an integral part of the person, into a habitus, [...] cannot be transmitted instantaneously (unlike money, property rights, or even titles of nobility) by gift or bequest, purchase or exchange." For this dissertation, I decided to understand them as interwoven constructs. Habitus represents embodied cultural capital, if the habitus is congruent to the field in which the individual actor is located (Edgerton & Roberts, 2014).

tional credentials. It arises from embodied cultural capital that teachers misinterpret as academic brilliance. Hence, the three types of cultural capital are mutually dependent; cultural capital is a dependent and independent variable of itself. In this dissertation, I focus on cultural capital in its embodied form because it is the most central form of cultural capital as the other forms evoke from it.

There has been a lot of debate on how to interpret Bourdieu's concept of cultural capital and how to operationalize it. According to Lareau and Weininger (2003), the dominant interpretation of cultural capital stems from DiMaggio's (1982) work. DiMaggio understood cultural capital as prestigious "highbrow" cultural practices such as reading literature, visiting a museum, or a theater play. Moreover, a very prominent measure of cultural capital is the numbers of book parents have at home and how much they read themselves or with their children (De Graaf, 1986; Evans et al., 2014; Georg, 2004; Jæger, 2011). Lareau and Weininger (2003), however, criticized these operationalizations as being too narrow. Cultural capital captures more than cultural tastes and objectives. Therefore, they suggested to understand cultural capital as "[...] institutionalized, i.e., widely shared, high status cultural signals (attitudes, preferences, formal knowledge, behaviors, goods and credentials) used for social and cultural exclusion [...]" (Lamont & Lareau, 1988, p. 156). In line with this understanding, Farkas et al. (1990) argued that cultural capital also entails important noncognitive skills such as a student work habits.<sup>2</sup>

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<sup>2</sup> For a summary of even more types of operationalizations of cultural capital see Lamont and Lareau (1988) and Lareau and Weininger (2003).

Related to the diverse operationalizations of cultural capital, a debate has arisen about the question whether cultural capital entails cognitive skills. Lareau and Weininger (2003) pointed out that the dominant understanding of cultural capital in the current literature holds the premise that cultural capital can be differentiated from other essential forms of knowledge and competence (e.g., human capital). Studies following this premise separate “cultural capital effects” on educational outcomes from “ability effects” by statistically controlling for ability (Dumais, 2002; Eitle & Eitle, 2002; Jæger, 2009; Jæger & Breen, 2016; Katsillis & Rubinson, 1990). Lareau and Weininger (2003) denounced this approach as limiting the potential of the concept of cultural capital and further argue that this premise is not visible in Bourdieu’s original work. In fact, they support the premise that any competence can function as cultural capital as long as it is unequally distributed in the society and more prevalent in upper social strata. Hence, Lareau and Weininger advocate for cultural capital entailing cognitive or academic skills.

However, if we conceptualize cultural capital as entailing skills and competencies, can we still argue that cultural capital is entirely arbitrary and its value is generated only by its scarcity and recognition of the dominant class (Bourdieu, 1984)? Several researchers have questioned this assumption (Edgerton & Roberts, 2014; Kingston, 2001; Nash, 1990; Sullivan, 2008). For instance, Nash (1990) argued, that “[t]he fundamental task of the school is to enable students to learn to comprehend the nature of the social and material world and to act upon it to achieve those individual and collective goals which give them reasons to act. All this requires a certain cognitive structuring

that is independent of the cultural arbitrary.” (Nash, 1990, p. 437). In line with this, Edgerton and Roberts (2014) claimed that knowledge about math and science as well as noncognitive skills such as self-discipline are socially well-established and increasingly necessary to individual progress in life. They cannot be “[...] discredited simply as ideological tools of dominant group legitimation” (Edgerton & Roberts, 2014, p. 205) (see also Sullivan, 2008). In contrast, a highbrow clothing or speech style represent rather arbitrary examples of cultural capital as they do not represent imperatives for education and learning. One possibility to reconcile the two approaches of cultural capital as arbitrary concept and cultural capital as concept entailing cognitive skills may be to conceptualize cultural capital as multidimensional constructs, consisting of dimensions that differ in their degree of arbitrariness (Kingston, 2001).<sup>3</sup> I will elaborate this thought in the next section.

#### *The understanding of cultural capital in this thesis*

In this work, I follow Lamont and Lareau’s (1988) broad definition of embodied cultural capital as cultural signals reflected in certain attitudes, preferences, competencies, and behaviors. However, I hold the perspective that these forms can be differentiated in two dimensions that differ in their arbitrariness. Cultural capital entails cognitive and noncognitive skills (which are important prerequisites for learning in school) as well as behaviors generating those (e.g., reading). These forms of cultural capital directly impact educational success

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<sup>3</sup> I am aware that I deviate here from Bourdieu’s view that cultural capital is always entirely arbitrary in any form.

by improving children's academic competencies and performance (skill-generating function). Therefore they are not entirely arbitrary. Arbitrary forms of cultural capital, however, are skills and behaviors that are not by nature important prerequisites for learning in school (e.g., beaux-arts participation). These forms of cultural capital only gain value for school success through their scarcity and recognition by the dominant class (symbolic function).

In contrast to Lareau and Weininger (2003) and Bourdieu's original writings, however, I do not conceptualize these two dimensions of cultural capital as being closely tied together or even being an amalgamate.<sup>4</sup> While the dimensions together constitute the latent construct of cultural capital, they can still be studied as single dimensions. Accordingly, I conceptualize cultural capital as two-dimensional construct, each dimension having a distinct dominant function—a symbolic or skill-generating function. Doing so, allows to reconcile the above described debate about children's conversion of cultural capital as this conceptualization implies that the skill-generating and symbolic mechanisms can exist simultaneously next to each other. It is not a question of either or.

Furthermore, like in Bourdieu's original writing, I understand cultural capital is a dependent and independent variable of itself. Cultural capital entails skills but also generates skills. Like "skills beget skills" (Heckman, 2008), "cultural capital begets cultural capital":

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<sup>4</sup> Lareau and Weininger acknowledged that cultural capital has more than one dimension but wrote that "[t]he competence underlying the credential [...] has both a technical dimension and a status dimension. Bourdieu's argument is precisely that these two forms of competence cannot be disentangled, and that cultural capital therefore includes both *indissolubly*" Lareau and Weininger (2003, p. 581).



“[...] [S]tudies of the relationship between academic ability and academic investment show that they are unaware that ability and talent is itself the product of an investment of time and cultural capital.” *Bourdieu (1986: 253)*

In this citation, Bourdieu expressed the idea that a child's ability (child's cultural capital) is a product of the cultural capital of their parents.

The above described broad understanding of embodied cultural capital as an umbrella concept for various skills and behaviors, and the circular understanding of cultural capital as a dependent and independent variable of itself, is however not unproblematic (Kingston, 2001), and I will return to this in the closing chapter of this dissertation thesis.

### 2.1.2 *Cultural capital and educational advantages*

Now we have an idea about what the term cultural capital means, but how does it actually translate into educational advantages and success? According to Jæger (2009), for cultural capital to affect educational advantages, three conditions have to be met: 1) parents have to possess cultural capital, 2) parents must transmit their cultural capital, and 3) children must convert this cultural capital into educational success. Hence, the process of cultural reproduction can be differentiated into two broader processes: the transmission of cultural capital from parents to children and the conversion of cultural capital into educational success. Yet, Bourdieu has been criticized for a too thin description of how cultural capital is transmitted from parents to children (Sullivan,

2001) and how cultural capital is transformed into educational success (Jæger, 2009). However, these are the key mechanisms of the cultural reproduction theory as they fill the black box between parental cultural capital and children's educational outcomes (Jæger, 2009). In the following, I will summarize Bourdieu's writings about cultural capital transmissions and conversion and complement them with other researchers' arguments to provide a better picture of what may happen during these processes. I also provide a brief summary of empirical research on both processes.

*Transmission of cultural capital.* Bourdieu himself described cultural capital transmission as a "[...] diffuse, continuous transmission within the family [that] escapes observation and control [...]" (Bourdieu, 1986, p. 254). Hence, cultural capital transmission takes place throughout socialization in the family and represents "[to] no doubt the best hidden form of hereditary transmission of capital [...]" (Bourdieu, 1986, p. 246). The transmission starts very early in life, and even if transmission starts but with a delay, individuals will have difficulties to catch up. In contrast to objectified cultural capital that can be transmitted instantaneously, the transmission of embodied cultural capital requires active investment by parents:

"[...] it is because the cultural capital that is effectively transmitted within the family itself depends not only on the quantity of cultural capital, itself accumulated by spending time, that the domestic group possess, but also on the usable time (particularly in the form of the mother's free time) available to it (by virtue of its economic capital, which enables it to purchase the time of others) to ensure the

transmission of this capital and to delay entry into the labor market through prolonged schooling, a credit which pays off, if at all, only in the very long term." Bourdieu (1986: 253)

This quotation also expresses how economic capital, a proxy for time and monetary resources, can be transformed into children's cultural capital. Not only the transmitter of the cultural capital but also the recipient of cultural capital herself needs to invest time and effort to absorb and embody cultural capital (Bourdieu, 1986). Children who do not grow up in culturally rich environments can absorb the missing cultural capital through their school attendance only to a limited extent. It will not feel natural to them and provide the same advantages (Bourdieu, 1977).

While Bourdieu did not explicitly differentiate transmission mechanisms, Jæger (2009) introduced the differentiation between active and passive cultural capital transmission from parents to children (see also Van Hek & Kraaykamp, 2015). Jæger refers to passive transmission as the "parental socialization effect" and describes children's absorption of cultural capital by passive exposure to parental cultural capital. Children learn through observation how to act and behave in a culturally appropriate (Bandura & Walters, 1963; Bandura, 1977). Alternatively Jæger (2009) named the active form of cultural capital transmission the "parental investment effect" and describes how children absorb parental cultural capital through parental active investment behaviors (e.g., cultural communication of parents with children, taking the child to the theater). This form of investment requires parental cultural capi-

tal in the form of specific parenting logics, time, or monetary resources (Bourdieu, 1986; Chin & Phillips, 2004; Jæger, 2009; Lareau, 2003).

Several studies exist that have analyzed the transmission of cultural capital from parents to children. To examine the passive form of cultural capital transmission, researchers assessed the strength of the association between parents and children's stock of cultural capital. These studies showed that, indeed, children's cultural capital was positively associated with parental cultural capital (Ganzeboom, 1982; Ganzeboom et al., 1990; Georg, 2004; Jæger, 2009; Kraaykamp & van Eijck, 2010; Nagel & Ganzeboom, 2002; Wollscheid, 2014; Yaish & Katz-Gerro, 2012). The conclusion that children absorb cultural capital by mere exposure is, however, limited to the extent that the association between parental and children's cultural capital does not also reflect capital transmission through active efforts of parents.

To examine the active form of cultural capital transmission, researchers studied if active parental investment behaviors relate to children's cultural capital and found the expected positive association between the two constructs (Jæger, 2009; Van Hek & Kraaykamp, 2015). The active transmission of cultural capital can take on different shapes. Jæger (2009), for instance, studied to which extent cultural talk was related to children's cultural capital and found a significant positive association. Similarly, Van Hek and Kraaykamp (2015) found that parents actively transmit their cultural capital to their children by taking them to a theater, museum, or concert hall. Another form of parental active transmission is parental reading promotion which has been shown to be related to children's own reading behavior (Cheung & Andersen, 2003; Kraaykamp, 2003).

The relative importance of the active and passive transmission mechanisms is not discussed by Bourdieu, but the presented research indicates that both mechanisms are likely to exist and are theoretically distinguishable (Jæger & Breen, 2016). While research by Jæger (2009) suggests that both mechanisms are similar in size, research by Van Hek and Kraaykamp (2015) indicates a much stronger association between active transmission and children's cultural capital compared to passive transmission. These conflicting results most likely stem from the different operationalizations of active and passive transmission.

*Conversion of cultural capital.* After the successful transmission of cultural capital from parents to children, children have to convert their observed cultural capital into educational success (Jæger, 2009). In the majority of Bourdieu's writings, the child is not described as a very active agent in the conversion process.<sup>5</sup> Bourdieu states that the central path through which cultural capital is converted into educational advantages is through the symbolic value of cultural capital. Teachers misread children's display of cultural capital as a symbol of academic brilliance and tend to evaluate children rich in cultural capital more positively than children who do not possess cultural capital. Hence, the child is not understood as an active agent but rather a passive victim of these "rules of the game." This conversion mechanism is particularly likely to appear in educational systems that rely on teacher grades rather than standardized test scores, such as in Germany.

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<sup>5</sup> The only exception may be the process of self-selection, where Bourdieu (1973) argues that children with low cultural capital self-select themselves out of the education system by leaving school because they feel alien in the culturally loaded educational institutions.

In addition to biased teacher evaluations, other researchers have argued that students' display of cultural capital can lead to better teacher inputs (Jæger, 2011; Jæger & Breen, 2016). When teachers perceive children's cultural capital, they interpret it as a signal of higher social class membership. This makes teachers consciously or unconsciously change their behavior towards these children, because they assume that children from a higher social class should be smarter than children from a low social class and more responsive to their input. Like a self-fulfilling prophecy (or also known as the Pygmalion effect), these behaviors lead to a better learning environment for the child and consequently to better academic performance of children (Farkas et al., 1990; Gentrup et al., 2020; Rosenthal & Jacobson, 1968).

Researchers following this premise of the "symbolic function" of cultural capital operationalized cultural capital with beaux-arts cultural participation and tested to which extent cultural capital relates to academic outcomes (Aschaffenburg & Maas, 1997; DiMaggio, 1982; Dumais, 2002; Ganzeboom et al., 1990; Kalmijn & Kraaykamp, 1996; Katsillis & Rubinson, 1990). These studies did not test the mechanisms through which this conversion actually takes place but most of them relied on Bourdieu's argument that children's and parental cultural capital leads to biased teacher evaluations (passive conversion). With the exception of Katsillis and Rubinson (1990) who did not find any significant association between children's cultural participation and grades, previous research has found that children's as well as parents' cultural participation (e.g., museum or theaters attendance) is positively related to teachers' performance evaluations (DiMaggio, 1982; Dumais, 2002; Katsillis & Rubinson, 1990) or children's educational

attainment (Aschaffenburg & Maas, 1997; Ganzeboom et al., 1990; Kalmijn & Kraaykamp, 1996). To the best of my knowledge, so far no experimental study exists that directly measured how cultural capital impacts teacher behavior and judgement of children's academic performance, but researchers have run experiments to test if teachers have biased perceptions of students based on their socio-economic background. Tobisch and Dresel (2017) found in their vignette study that teachers judged students' general abilities, willingness to put in effort, and qualification for higher secondary school more positively if these students had a common middle-class name instead of a lower-class name. Using a similar experimental design, Wenz and Hoenig (2020) showed that teachers' grading of an essay were not biased by students socio-economic status (manipulated by a child's name). However, they found that teachers perceived children from a families with a higher socio-economic status as more likely to succeed in Gymnasium (highest secondary educational track in Germany).

In contrast to the indirect pathway of the conversion of cultural capital into educational advantages via the teacher, a group of other researchers suggested a direct pathway from children's cultural capital to their skills and academic competence, representing a "skill-generating function" of cultural capital (Crook, 1997a; De Graaf et al., 2000; Kingston, 2001; Sullivan, 2001). The key argument is that through the absorption of parental cultural capital and the execution of specific cultural activities, children develop new skills and foster existing ones (Aschaffenburg & Maas, 1997). Children improve their cognitive skills (e.g., reasoning, reading) and develop noncognitive skills (e.g., grit, conscientiousness) that help them in the school context

and improve their educational outcomes. Hence, teachers' misinterpretation of cultural capital is not required to increase children's academic performance evaluation.

Researchers who acknowledge this understanding of children's cultural capital conversion, have measured cultural capital not only with beaux-arts cultural participation but also with reading behavior (Breinholt & Jaeger, 2020; Cheung & Andersen, 2003; Crook, 1997a, 1997b; De Graaf et al., 2000; De Graaf, 1986, 1989; Georg, 2004; Jæger, 2011; Jæger & Breen, 2016; Leopold & Shavit, 2013; Sullivan, 2001). This approach is based on the assumption that not all cultural capital indicators are to the same extent "skill-generating." While beaux-arts cultural participation rather represents selective and passive consumption, cultural classes or reading are, on average, more regular and active processes by the child herself. Therefore, active cultural behaviors are particularly likely to grow skills and directly contribute to better academic performance.<sup>6</sup>

Researchers following this approach challenge the assumption that cultural capital merely translates via its symbolic value to educational success and argue that reading climate at home relates to educational attainment by improving children's reading skills. Indeed, the evidence suggests that cultural capital entails a dimension that is skill-generating and is related to higher general ability (Cheung & Andersen, 2003) and academic test scores (Breinholt & Jaeger, 2020; Jæger & Breen, 2016; Leopold & Shavit, 2013; Sullivan, 2001). In fact, some studies

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<sup>6</sup> Some critics may argue that mere passive cultural consumption also contributes to skill-growth for instance in abstract thinking. Nevertheless, I would argue that active cultural behaviors more strongly and directly relate to skill-growth compared to passive cultural consumption.



even challenge the assumption whether cultural capital has a symbolic function at all and suggest that it mainly operates as skill-generating (Breinholt & Jaeger, 2020; Evans & Kelley, 2002). Hence, a debate about the symbolic or skill-generating functions of cultural capital remains ongoing.

*Transmission and conversion.* The majority of previous research has focused either on the transmission or the conversion of cultural capital. Jæger and Breen (2016) made a novel contribution by describing and studying the complete process of cultural reproduction. Their models represent an essential inspiration for the theoretical framework described at the end of this chapter and therefore will be described more in detail. They formalized the above described mechanisms of cultural capital transmission and conversion within several related equations describing the development of children's cultural capital, academic performance, and socio-economic success. Thereby, they consciously deviated from Bourdieu's original notions in order to provide an "updated" model of cultural reproduction. They proposed that a child's cultural capital depends on parents' stock of cultural capital, parents' active investments, other family resources (e.g., socio-economic status), and a child's academic ability.<sup>78</sup> Educational performance in turn

<sup>7</sup> Jæger and Breen (2016) did not provide any rationale for including children's ability as predictor of cultural capital. A potential argument however could be that individual differences in information-processing capacity influences children's capacity to consume and absorb cultural capital (Ganzeboom, 1982).

<sup>8</sup> If the possession of cultural capital is a necessary condition for the cultivation of children's cultural capital remains an open question. According to Jæger and Breen (2016), parents can instill cultural capital in their children that they do not possess, for instance, by enrolling their children in suitable leisure activities. Hence, the authors assume that active transmission can take place without the possession of cultural capital. Accordingly, they described the passive transmission (determined by the stock of parental cultural capital) and active transmission as two additive influences on children's cultural capital rather than interactive. At the same time, however, the authors also argue that the effect of passive and active transmission of cultural capital is greater than zero.

depends on a child's cultural capital, a child's academic ability, and luck. The final educational attainment is a product of educational performance, family resources, children's ability and luck. The final stage in the cultural reproduction process—a child's socio-economic position—depends on a child's final educational attainment, family resources, a child's academic ability, and luck.

Besides this static model of cultural reproduction, they also proposed a dynamic model of cultural reproduction that describes two black boxes of Bourdieu's theory: the mechanisms of parental cultural capital transmission and the mechanism of a child's conversion of cultural capital into educational success. In the dynamic model, a child's performance, depends on teacher inputs (e.g., evaluations, attention), a child's ability, family resources, and luck (including other unmeasured factors). In turn, teacher inputs depend on a child's performance in the previous period, a child's cultural capital, and luck. Regarding parental decision-making about investments in their child's educational performance, they assumed that parents seek to maximize utility by making the optimal investment of their stock of cultural capital. The cost of investment decreases with parent's stock of cultural capital. Using linear dynamic panel data models, they found that in line with their argument, children's accumulation of cultural capital is dynamic and that parents transmit cultural capital via a passive and active mechanism to their children. Overall, their formalization makes crucial assumptions and mechanisms of the cultural reproduction theory transparent and testable.

*In summary*, the empirical findings support the theoretical argument of Bourdieu, that parents transmit their cultural capital to their children,

although it is not a one-to-one transmission. However, the mechanisms of this transmission remain foggy. Regarding the conversion of cultural capital, the distinction between skill-generating and symbolic function was a crucial step forward in cultural capital research. Yet, the evidence about cultural capital conversion mechanisms less clear, and skepticism about the “symbolic effect” of cultural capital on academic outcomes remains. Furthermore, elaborated descriptions of how children and parents convert their cultural capital into educational advantages are still rare, and little is known about the micro interactions between parents, children, and teachers. In this regard, Annette Lareau made an essential contribution by introducing the concept of concerted cultivation based on her ethnographic study on parents with children in elementary school. I will devote the next chapter to her theoretical arguments about the transmission and conversion of cultural capital.

## 2.2 CONCERTED CULTIVATION

“Both concerted cultivation and the accomplishment of natural growth offer intrinsic benefits (and burdens) for parents and their children. Nevertheless, these practices are accorded different social values by important social institutions. There are signs that some family cultural practices, notably those associated with concerted cultivation, give children advantages that other cultural practices do not.”

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*Annette Lareau (2011:241)*

To better understand how parents transmit their cultural capital to their children during socialization and how children and parents convert their cultural capital into educational advantages, it is useful to complement Bourdieu’s ideas with the work of Lareau (2003). Using a broad definition of cultural capital, including cognitive and noncognitive skills, Lareau applied Bourdieu’s theoretical ideas to parental child-rearing and thereby provided a crucial elaboration of cultural capital transmission and conversion. She argued that middle-class parents apply specific parenting strategies to pass on cultural capital and assure their children educational advantages. According to her, Bourdieu’s work did not pay enough attention to the difference between cultural capital possession and activation. Moreover, she criticized that his writings did not describe enough the role of important “gatekeepers” such as teachers and authorities in schools. Her writings

about parenting logics and social class address these weaknesses. In the following, I will describe her theoretical ideas and summarize the existing empirical evidence about them.

### 2.2.1 *Definition and understanding of concerted cultivation*

Lareau (2003) observed in her ethnographic study in families with elementary school children that working-class and middle-class parents differ in their cultural logic of child-rearing (Lareau, 2003).<sup>9</sup> A cultural logic of child-rearing describes “sets of paired beliefs and actions” and represents—speaking in Bourdieu’s terms—parents’ embodied cultural capital.<sup>10</sup> Middle-class parents engage in so called “concerted cultivation” and feel responsible for continually growing their child’s skills and talents. Working-class families, in contrast, engage in so called “accomplishment of natural growth”.<sup>11</sup> They believe that the child should grow freely and focus on the provision of love, food, and safety to secure their child’s successful development.

Lareau observed that these differences in parenting logics become visible along three salient dimensions: 1) organization of daily life, 2) language use, and 3) interventions in institutions.<sup>12</sup> Parents embracing

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<sup>9</sup> In the following, I will use the term “cultural logic of child-rearing” interchangeably with the terms of “parenting logics” or “parenting strategies.”

<sup>10</sup> Lareau chose the term “cultural logic” very consciously to differentiate her concepts from the popular term of “intensive mothering” as reflected in the following citation: “Working-class and middle-class mothers may express beliefs that reflect a similar notion of ‘intensive mothering,’ but their behavior is different.<sup>1</sup> For that reason, I have described sets of paired beliefs and actions as a ‘cultural logic’ of child rearing.” (Lareau, 2011, p. 237)

<sup>11</sup> I will often refer to simply “concerted cultivation” rather than both concepts as they represent a dichotomous typology.

<sup>12</sup> In one of Lareau’s publications 2002 she introduced a fourth dimension named “social connections,” which describes how the strength of the ties to the extended

concerted cultivation tend to enroll their children in several organized leisure activities to foster their talents and build important life skills. At home, middle-class parents create a stimulating home environment through their language use and their conversations with their children are marked by reasoning and negotiation. They actively try to develop children's verbal and critical thinking skills. Moreover, these parents intervene in school matters and do not hesitate to criticize teachers to secure the best developmental conditions for their children. In contrast, working-class parents embracing "accomplishment of natural growth," give their children much freedom in spending their leisure time unless they have to do chores. Hence, children spend more of their leisure time in informal play rather than in organized leisure activities. The language of working-class families was dominated by directives rather than reasoning and extended verbal discussions were scarce. Moreover, these parents perceived the school and home as separated spheres, contact between parents and the school was rare, and if families tried to intervene on behalf of their children, they were mostly unsuccessful. In summary, middle-class parents—following a concerted cultivation parenting logic—strategically ensure a target-oriented learning environment at home, school, and during leisure time (informal, formal, and non-formal education settings) while working-class parents—following an accomplishment of natural growth parenting logic—let their children's learning environments evoke more naturally without intervention.

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family depends on social class. I refrained from discussing this dimension in my thesis as the other dimensions are more directly related to educational advantages in school.

2.2.2 *Concerted cultivation and educational advantages*

Thus far, we have an understanding about Lareau's terms of "concerted cultivation" and "accomplishment of natural growth," but how do they relate to educational advantages? To explain the generation of educational advantages, the idea of concerted cultivation resembles the core structure of the cultural reproduction theory. The same three key actors are involved: parents, children, and the teacher. Also, cultural capital generates educational advantages through the two steps of transmitting cultural capital and converting cultural capital. However, in contrast to Bourdieu, Lareau's theorizing on concerted cultivation describes these steps more in-depth, focusing on micro-interactions between the three key actors. Moreover, she emphasizes the necessity and process of cultural capital activation by parents and children. Compared to Bourdieu's concept of cultural capital, Lareau's concepts of concerted cultivation and accomplishment of natural growth are relatively "young". Nevertheless, they have already stimulated some qualitative and quantitative studies, which I will summarize in the following.

*Transmission of cultural capital.* Applying the terms of Jæger (2009), concerted cultivation can be understood by distinguishing between active and passive forms of cultural capital transmission. As explained earlier, passive cultural capital transmission occurs when children observe their parents' behavior and mimic it. Active transmission of cultural capital, in contrast, occurs when parents actively shape the learning environments of their children or teach them specific skills (e.g., reasoning, interacting with authorities). Lareau's work highlights

the active transmission of cultural capital, which I will describe in the following.

Previous research has tested Lareau's argument that distinct parenting logics explain differences in children's cognitive and noncognitive skills. This research has shown that concerted cultivation, measured as a latent construct, explained a modest portion of differences in academic abilities of (pre)school children based on socio-economic background (Bodovski & Farkas, 2008; Cheadle, 2008, 2009). Besides research examining the full model of concerted cultivation, some studies have studied single dimensions of concerted cultivation. Indeed, critical voices even argued that single indicators of concerted cultivation contribute to skill differences rather than concerted cultivation on the whole (Pensiero, 2011).

In comparison to the other dimensions, a frequently studied dimension is the organization of children's daily life, measured by children's organized leisure activities.<sup>13</sup> Middle-class parents expect that participation in organized leisure activities improves their children's cognitive skills, but also teaches children "life skills" such as perseverance, following rules, and dealing with competition. These are crucial skills that pay off in the school context and later in life as they allow children to comply with institutional standards better. Long stretches of free play, as common in working-class families, also stimulated the development of skills such as creativity and peer conflict resolution (Lareau, 2003). However, in the school context, these did not pay off to the same

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<sup>13</sup> The strategy of children's enrollment in organized leisure activities can also be conceptualized as a form of parental active investment (instead of mere transmission), because it allows parents to instill cultural capital in their children that they do not possess themselves (e.g., children learn about classical music during piano lessons, even if parents do not possess this form of cultural capital).



extent as the skills learned through organized leisure activities. Hence, using Bourdieu's vocabulary, only the skills learned through concerted cultivation represent a form of cultural capital.

Several studies tested if organized leisure activities do indeed result in higher skills and academic outcomes. The majority of this research has showed that school children's enrollment in organized leisure activities relates to higher test scores (Dumais, 2006), teacher ratings (Dumais, 2006), and school grades (Coulangeon, 2018; Redford et al., 2009). Yet, studies that differentiated organized leisure activities and studied specific forms of organized leisure, indicate that not all activities contribute to the same extent to children's cognitive and noncognitive skill generation (Coulangeon, 2018). For instance, Cabane et al. (2016) found that adolescent music activities rather than sports activities relate to higher basic cognitive skills. However, dance and sports have been shown to relate to noncognitive skills of third graders (Covay & Carbonaro, 2010).

Another form of active cultural capital transmission in middle-class families is parents' use of language and their coaching efforts to train children's communicative skills. Lareau observed that middle-class parents actively trained children in the ability to verbally express their opinion and taught them how to actively approach authority figures (e.g., doctors) to reach their goals. So far, research about the concerted cultivation dimension of language use and communication is rather rare. However, the role of language in the reproduction of educational inequalities was already pointed out by other theorists such as Bourdieu (1991) and Bernstein (1977) and has been examined by empirical research. Supporting Lareau's argument that language

use relates to children's verbal skills, studies have found that parents from different socio-economic backgrounds speak differently with their children. Parents with a higher socio-economic status had a richer vocabulary and used more spoken vocabulary per hour so that their children developed more vocabulary and speaking skills (Farkas & Beron, 2004; Hart & Risley, 1995).

In sum, the evidence suggests that concerted cultivation as a latent construct but also single concerted cultivation indicators represent mechanisms through which higher social class parents transmit cultural capital (in the form of cognitive and noncognitive skills) to their children.

*Conversion of cultural capital.* As described in the previous section, children growing up under concerted cultivation developed specific cognitive and noncognitive skills. These skills are rewarded in school and directly support children's performance in school. Therefore, cultural capital in the form of concerted cultivation encompasses a skill-generating function.

Besides this direct channel through which concerted cultivation is related to children's higher academic performance, there also exists a more indirect channel. Middle-class parents actively coach their children to grow a specific mindset within children, the so called "sense of entitlement." Children with a sense of entitlement feel entitled to pro-actively shape and improve their learning environments by influencing teacher inputs. Thus, "entitled" children improve their academic performance indirectly by influencing teacher input through their own actions. This observation adds an important layer to Bour-

dieu's theorizing on cultural capital conversion because it describes how children actively secure advantages in school rather than just being a passive agent in the reproduction process relying on teacher biased evaluations (symbolic function of cultural capital). Hence, it can be seen as an "empowering function" of cultural capital. In the following, I describe this indirect cultural capital conversion mechanisms more in detail and summarize the existing research.

Lareau's (2003) research has shown that middle-class children who have a sense of entitlement did not hesitate to approach authorities, ask questions, or request their help. Working-class children, raised under "accomplishment of natural growth," in contrast, learned through many subtle ways a "sense of constraint". These children had considerable respect for authorities and were shy to ask questions. Building on Lareau's results, Calarco conducted ethnographic studies in which she examined more closely the role of children's cultural capital and how children actively converted it into educational advantages in the classroom (Calarco, 2011, 2014). Similar to Lareau's results, her research shows that middle- and working-class families differ in how they coach their children for the classroom. For instance, working-class parents taught their children to respect teachers' authority by not seeking help. In contrast, middle-class parents encouraged their children to ask teachers for help when problems occur. These class-based coaching strategies in turn influenced how children interacted with teachers (Calarco, 2014). Children of middle-class parents asked more for help and used different strategies to receive teacher support (Calarco, 2011). These children were very proactive in the interaction with teachers and even interrupted teachers to make a request.

Teachers were more responsive to these requests so that middle-class children received more support from the teacher. This allowed children to be better able to complete school assignments. Hence, children played an active role in the creation of educational (dis)advantages at school. While some qualitative studies support the idea of the sense of entitlement that middle-class child exhibit with benefits in the education system (Calarco, 2011, 2014; Jack, 2015), quantitative research on children's sense of entitlement is rare (for a review see Golann & Darling-Aduana, 2020). This is likely to be related to the challenge of quantifying this rich concept (Cardona et al., 2015).

Moreover, Lareau research has suggested that not only middle-class children but also middle-class parents feel entitled and enact their cultural capital by approaching teachers and requesting changes in their children's educational experience (third dimension of concerted cultivation). Lareau (2000) observed that some of the middle-class parents even felt that they have to direct and supervise teachers. Working-class parents, in contrast, felt that they were missing specific vocabulary and pedagogical knowledge to criticize and discuss with teachers. They were more likely to feel inferior to teachers and lacked the right strategies to influence teachers. Consequently, they perceived school and home more often as separated spheres compared to middle-class parents (Lareau, 2000). This perception is reflected in rare and unsuccessful contacts between working-class parents and teachers. In support of this argument, previous research has shown that parents with a lower socio-economic status report lower levels of school-based parental involvement (Barg, 2019b; Crosnoe, 2012; Grolnick et al., 1997; Kohl et al., 2000; Young, 2020). Only a few studies exist that reported

the opposite pattern that parents with a higher socio-economic status are less often involved in school matters (Killus & Paseka, 2016; Mahmood, 2013; Sacher, n.d.). Differences in these results may derive from distinct study contexts or variations in the measure of parent-school contact (e.g., formal versus informal interactions).

*In summary*, Lareau's work on cultural logics of child-rearing provides a thick description of the transmission and conversion of cultural capital. Her work distilled key cultural transmission mechanisms taking place during socialization: parental language use, active coaching of children, and children's enrollment in organized leisure. Furthermore, she described how cultural capital is actively converted into educational advantages through micro-interactions between parents and teachers as well as children and teachers. The findings of previous research on child-rearing logics suggest that family life and parenting differ by parental socio-economic status, as proposed by Lareau. There is little support for Kingston (2000) who argued that there are no visible class lines in parenting. Nevertheless, in particular, quantitative research on the concept of concerted cultivation is still little, and several open questions remain. For instance, we know little about the generalizability of Lareau's concepts to different contexts such as early childhood or other countries with a different parenting culture as the majority of research has taken place in the U.S. school context.

### 2.3 INTEGRATED THEORETICAL FRAMEWORK

To summarize the above presented arguments about the processes of cultural reproduction and the evolution of primary effects, I developed an integrated framework that brings together Bourdieu's theory of cultural reproduction and Lareau's theorizing on parenting logics. This framework describes the multiple mechanisms that lie between parental socio-economic status and children's academic performance. The core structure of this framework is inspired by Jæger and Breen (2016) who dissected the cultural reproduction theory in two core processes: parents (active or passive) transmission of cultural capital and children's conversion of cultural capital into educational advantages. However, I deviate from Jæger and Breen (2016) in one central regard: I understand a child's academic ability as part of their cultural capital, and as being a product of genetics and parental cultural capital (here: skill-generating forms of cultural capital). Jæger and Breen (2016), in contrast, conceptualized a child's academic ability as given, without any elaboration about how ability is generated.<sup>14</sup>

The conceptual model of the framework is presented in Figure 2.1. It did not aim to include all aspects of Bourdieu's cultural reproduction theory (e.g., the concept of field). The graphical representation of the framework is restricted to the paths which are relevant to understand the connections between the three empirical papers of this thesis. I

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<sup>14</sup>I further disagree with them in the regard that they did not include a child's cultural capital in the equations of a child's final educational attainment and socio-economic position. I would argue that a child's cultural capital above and beyond a child's final performance can impact educational attainment (e.g., through self-selection). Also, a child's cultural capital above and beyond a child's final educational attainment can impact her final socio-economic position. However, as these outcomes are not in the focus of my dissertation thesis, I will not elaborate these ideas here any further.

will return to some of the missing paths and aspects of the cultural reproduction theory in the closing chapter of this thesis.

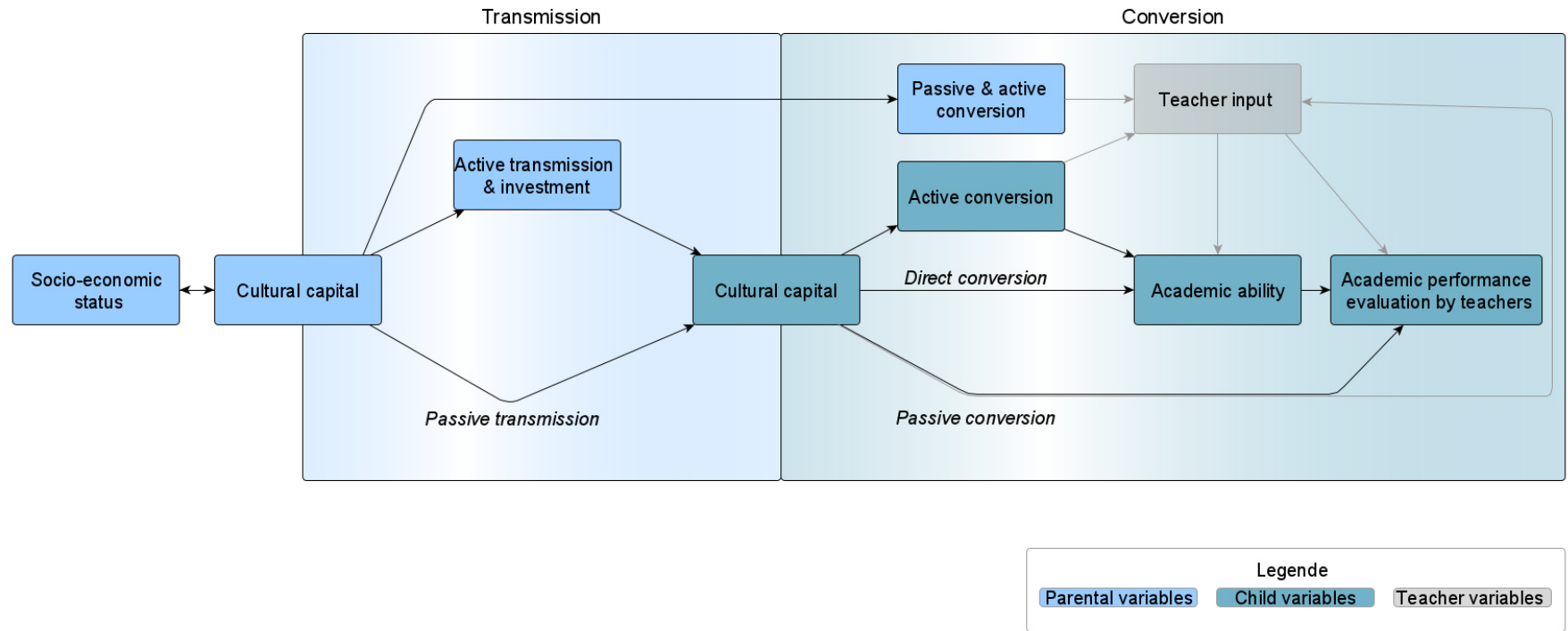


Figure 2.1: Conceptual graph of theoretical framework.



According to Bourdieu's theory of cultural reproduction, families with a higher socio-economic status embody more cultural capital compared to families with a lower socio-economic status. This advance in cultural capital is transmitted to the next generation during a child's socialization within the family. According to Bourdieu (1986), this can happen rather unconsciously and naturally. During socialization, cultural capital travels to the next generations via observational learning (passive transmission), but also by active parental investments and transmission efforts (active transmission/investment). These active investments of parents with a higher socio-economic status have been named by Lareau "concerted cultivation." Concerted cultivation describes specific parenting beliefs and is an umbrella concept for a rich set of active investment behaviors, including the outsourcing of cultural capital transmission through children's enrollment into organized leisure activities and the active coaching of children for interactions with authorities. Being raised under concerted cultivation, middle-class children develop a rich set of cognitive and noncognitive skills<sup>15</sup> and a so called "sense of entitlement" which represents a facet of children's embodied cultural capital.

After cultural capital is successfully transmitted to children, it channels into higher academic success. Bourdieu mainly described in his work the indirect conversion of a child's cultural capital via the teacher—the symbolic function. Teachers perceive children's cultural capital and bias their evaluation of a student's performance by misreading cultural capital as academic brilliance (passive conversion). In addition, as

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<sup>15</sup> Research has shown that children's cognitive skills are to some extent also transmitted directly via genetics and derive from a complex interaction of genetics and environment (Baier & Lang, 2019; Branigan et al., 2013). However, as I refrained from showing this path because it is not in the focus of this thesis.

pointed out by Farkas et al. (1990), teachers may adjust their teaching input based on the display of children's cultural capital. In the long run, this can lead to higher academic abilities. As added by Lareau (2003) and Calarco (2011), the conversion of cultural capital also depends on the extent to which an individual is activating it. Children with a "sense of entitlement" are actively securing educational advantages for themselves in the classroom (active conversion). For instance, they naturally approach the teacher to ask for help when they have trouble to understand something in class. Hence, children who possess and activate cultural capital can influence teacher input. Finally, according to the position of Jæger (2009) and De Graaf et al. (2000) the absorption of children's cultural capital can directly channel to higher academic abilities (direct conversion).

As suggested by Lareau's concept of concerted cultivation, not only children but also parents can activate their cultural capital to secure their children educational advantages. According to Lareau (2003), also middle-class parents feel entitled and do not hesitate to intervene in school matters. By approaching the school and displaying their cultural capital (as sign of social status) they passively and actively influence teacher input and teacher's evaluations (Calarco, 2019; Young, 2020).

This theoretical framework builds the backbone of my thesis and displays the underlying assumptions of my work. In the empirical work of this thesis, I examine certain aspects of this rich framework and its assumptions. I will provide an overview of my empirical contribution in the next chapter.

## 2.4 OVERVIEW OF THE EMPIRICAL STUDIES

The above-presented summary of empirical and theoretical knowledge shows that multiple pathways exist that lie between parental socio-economic status and children's educational performance. Yet, in the scope of this dissertation, I restrict my analysis to some of the most central paths. In this chapter, I will briefly describe the aims of this thesis and state the research gaps that are addressed with the three empirical studies.

To answer the first overarching research question—how parents transmit their cultural capital to their children and activate their cultural capital to secure educational advantages for their children—concerted cultivation was studied in the context of early childhood. Although Bourdieu (1986) emphasized the role of early socialization for the development of cultural capital, research on cultural capital transmission has mainly focused on school children. Also, Lareau's research focused on parents with children in school as well as the majority of subsequent research on her theoretical concepts (e.g., Bodovski & Farkas, 2008; Carolan, 2016; Carolan & Wasserman, 2015; Redford et al., 2009). However, the literature on parental investment in general indicates that parents already follow an approach of concerted cultivation before children enter school. This research has shown that parents with a higher socio-economic status are more likely to provide their children a stimulating home-environment to support their skill growth (Anders et al., 2012; Duncan et al., 1994; Guo & Harris, 2000; Kluczniok & Mudiappa, 2018).

Hence, the question arises if the salient dimensions of concerted cultivation observed in the school context are also visible in the context of early childhood. Put differently, is the phenotype of concerted cultivation in school the same as in early childhood, and does this investment of parents lead to the expected educational advantages? To answer these questions, two studies on the role of concerted cultivation during early childhood were conducted using a sample of parents and their 4-year olds. These studies provide not only valuable empirical knowledge on the transfer of educational advantages but also examine scope conditions of Lareau's theoretical concepts by testing them in a different context.

In the first study, the focus lies on the concerted cultivation dimension of the organization of daily life. Applying Lareau's ideas to the context of early childhood, Study 1 examines if concerted cultivation is not only visible in children's organized leisure activities but also in parental cognitive stimulation at home—a popular form of parental investment in early childhood. Furthermore, the study investigates to which extent these forms of parental investment explain differences in children's cognitive skills based on socio-economic status. While parental cognitive stimulation at home has been often shown to be related to children's school readiness (Anders et al., 2012; Duncan et al., 1994; Guo & Harris, 2000; Kluczniok & Mudiappa, 2018), we know little about the academic benefits of organized leisure activities at this early age and if these represent another channel of cultural reproduction.

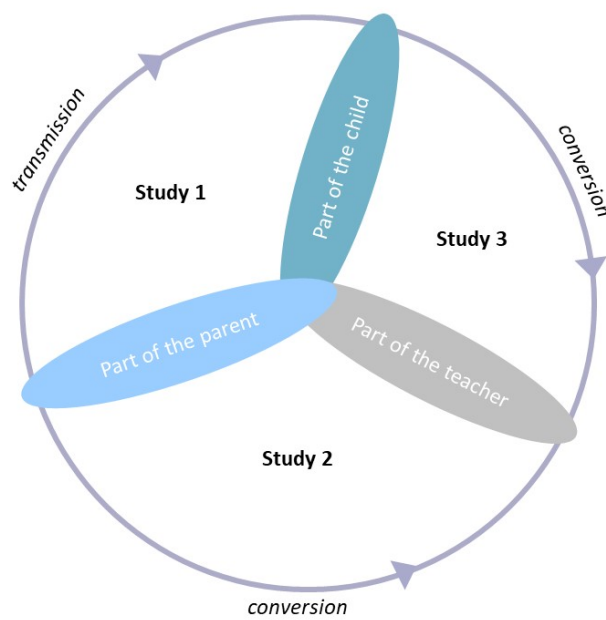
In the second study, the focus shifts to another concerted cultivation dimension: interactions between parents and teachers. Lareau (2000)

observed that parents with a lower socio-economic status perceive the school and home as separated spheres, while parents with a higher socio-economic status are in close contact with the school to monitor their children's development. Indeed, several quantitative studies have shown that parental socio-economic status is positively related to parent-school contact (Barg, 2019b; Crosnoe, 2012; Grolnick et al., 1997; Kohl et al., 2000). However, little is known about the extent to which these findings can be generalized to the context of early childhood. To close this gap, Study 2 examines whether parental socio-economic background is positively related to frequent contact between parents and teachers in the context of early childhood. Furthermore, Study 2 investigates if the degree of parent-teacher contact does not only relate to parental social background characteristics but also to teachers' and institutional characteristics. The argument that parent-school contact is also influenced by teachers and institutions is often neglected by sociological theories on parent-school contact but is a common position of educational scientists (Boag-Munroe & Evangelou, 2012; Eccles & Harold, 1996; Epstein, 1990; Harris & Goodall, 2008).

To answer the second overarching research question—how children's cultural capital is converted into high educational performance—the third study focuses on the pathways through which a child's cultural capital is converted into higher academic performance once children enter school. Although the teacher plays an important role in Bourdieu's theory of cultural reproduction and the symbolic function of cultural capital is one of the key assumptions, much of the previous research has relied on this assumption instead of testing it thoroughly. However, some researchers have questioned the symbolic function of

cultural capital and favor the assumption that cultural capital mainly transfers into higher academic performance through its skill-generating function (e.g., Breinholt & Jaeger, 2020; De Graaf et al., 2000; Kingston, 2001). To clarify the conversion mechanisms of cultural capital, these two mechanisms are carefully tested against each other, paying close attention to the operationalization of cultural capital and academic outcomes. Previous research has neglected the interplay between the multidimensionality of cultural capital and the operationalization of academic success.

In sum, each study focuses on one intersection of the three key actors of cultural reproduction theory (see Figure 2.2). Study 1 provides an inside into the intersection of parents and children and how the transmission of cultural capital takes place. Study 2 focuses on the intersection of parents and teachers and tests if parent-teacher contact is related to parents' socio-economic status. Study 3 has its focus on children and teachers and examines how children's academic outcomes relate to their cultural capital. The central purpose of all three studies is to understand better how parents with a higher socio-economic status transmit their educational advantages to their children. Only if we understand the underlying mechanisms and make them visible can suitable interventions be developed to achieve the goal of reducing educational inequality.



**Figure 2.2:** Conceptual overview of the foci of the three empirical studies.

# 3

## STUDY 1. CONCERTED CULTIVATION IN EARLY CHILDHOOD AND SOCIAL INEQUALITIES IN COGNITIVE SKILLS: EVIDENCE FROM A GERMAN PANEL STUDY

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## ABSTRACT

According to Lareau's (2003) concept of concerted cultivation, upper and middle-class parents aim more systematically to promote their children's skills in various ways in comparison with lower class parents. These differences in parenting are assumed to affect children's skill development. Whereas Lareau developed her concept for families with elementary school children, and much of the subsequent literature has focused on this age group or older, we argue that concerted cultivation is likely to be visible already during early childhood. Therefore, we investigated if participation in organized leisure activities and parents' promotion of cognitive stimulation during early childhood—as two indicators of concerted cultivation—explain later differences in cognitive skills. We furthermore examined if concerted cultivation mediates the association between social background and cognitive skills of children. We drew on longitudinal data from 1,632 children in the Starting Cohort 2 of the German National Educational Panel Study (NEPS). We show that parents with high socio-economic status are more likely to enroll their 5-year-old children in organized leisure activities and to read to them daily. Results from lagged dependent variable regressions indicate that only enrollment in music mediates the relationship between parental socio-economic status and children's skill development in math and reasoning. Our study highlights the prevalence of concerted cultivation as a parenting style of the German middle-class already during early childhood. Nevertheless, it only moderately contributes to children's cognitive skill development. Our mediation analysis showed that only music participation explained

a modest portion of the background-specific differences in math and reasoning skills.

### 3.1 INTRODUCTION

Cognitive skills are an important predictor not only of educational attainment (Bernal & Keane, 2011; Bourne et al., 2018) but also of longer term outcomes such as earnings (Murnane et al., 2000) and health (Bijwaard et al., 2015). Therefore, cognitive skills represent a central resource that may support success in various life domains. Research has shown that even before starting school, children from families with higher socio-economic status have, on average, an advantage in cognitive skills over their peers from lower socio-economic statuses (Bradley & Corwyn, 2002; Duncan & Magnuson, 2012; Feinstein, 2003). Yet, how do these differences in cognitive skills develop at an early age?

Previous research has suggested that parenting behaviors are key contributors to differences in children's skills (Anders et al., 2012; Mikus et al., 2020; Niklas & Schneider, 2017; Sylva et al., 2013). In this paper, we therefore studied the role of parenting behaviors during preschool years in creating cognitive skill differences between children from different socio-economic backgrounds. We focus on the non-monetary dimension of social background. We base our study on Lareau's (2003) argument that middle- and working-class parents differ in their parenting strategies: Whereas middle-class families try to actively foster the talents and skills of their children (concerted cultivation), working-class parents focus on fulfilling their children's basic needs and allow them to grow more freely (accomplishment of natural growth).

While several researchers have tested Lareau's theoretical ideas in quantitative and qualitative studies (Bodovski & Farkas, 2008; Cheadle & Amato, 2011; Chin & Phillips, 2004; Covay & Carbonaro, 2010), some questions remain unanswered. Previous research has rarely questioned if the core dimensions of parenting strategies described by Lareau are indeed the most salient parenting dimensions that differ between social classes and lead in turn to differences in children's development. To our knowledge, most previous research has either examined concerted cultivation with a combined measure of all three or four dimensions (Bodovski & Farkas, 2008; Cheadle & Amato, 2011; Cheadle, 2009; Redford et al., 2009), or has focused on single dimensions of concerted cultivation such as children's enrollment in organized leisure (Coulangeon, 2018; Dumais, 2006). Moreover, few researchers have explored to what extent Lareau's theoretical concepts can be applied to the context of early childhood. The salient parenting dimensions in which parent's different approaches of childrearing are reflected, may vary to some extent between early and late childhood. Research has shown that parents adjust their parenting behaviors according to their child's age (Kalil et al., 2012). For instance, preschoolers' leisure time is more tightly controlled by parents and more likely to involve direct interaction between children and parents, compared to older children (Hofferth, 2008; Kalil et al., 2012). Thus, we argue that concerted cultivation of preschoolers may take a different form than concerted cultivation of school children and is, to a certain extent, expressed in the degree of parental cognitive stimulation at home. To test this argument, we used German panel data and investigated the following research question: Does concerted cultivation at the age of five, measured as being enrolled in organized leisure activities and being

offered cognitive stimulation from parents, explain cognitive skill gaps between first graders from different socio-economic backgrounds at the age of seven?

Answering this question allows us to test our proposed theoretical extension and adds to previous research in three more regards. First, we examine the relative explanatory power of these two forms of parental investment in order to shed some light on the question under which conditions cultural activities contribute more to the child's development. It might be relevant if children learn informally from their parents or in more non-formal and structured contexts, such as music and sports lessons. However, previous research has rarely explored these two processes in combination. Second, little is known about the extent to which Lareau's research findings from the U.S. context transfer to other cultural contexts, such as Germany, where organized leisure activities are subsidized by the government. Most previous research on concerted cultivation has been based on data from the U.S. or other Anglo-Saxon countries (Bodovski & Farkas, 2008; Cheadle, 2008; Covay & Carbonaro, 2010; Dumais, 2006). Third, we use three different measures of children's cognitive skills (math test scores, reasoning skills and the ability to concentrate on a task). Previous research has mainly relied on academic test scores or basic cognitive ability tests to measure the relationship between concerted cultivation and cognitive skills, whereas reasoning skills and concentration are considered an important foundation for academic success.

### 3.2 EDUCATIONAL REPRODUCTION BY MEANS OF PARENTING

#### 3.2.1 *Concerted cultivation and accomplishment of natural growth*

According to Lareau's considerations, cultural differences in parenting strategies on the basis of social class may explain children's distinct developmental paths (Lareau, 2002, 2003). Her ethnographic research on families in the U.S. has suggested that parents' perceptions of what children need for successful development are stratified by social class. She has identified two distinct parenting strategies, termed "concerted cultivation" and "accomplishment of natural growth". A parenting strategy is understood as an umbrella concept for a set of parenting behaviors and investments that follow an overall aim. Middle-class parents tend to engage in parenting behaviors such as enrolling their children in adult-orchestrated organized activities and reasoning, negotiating, and intervening in school on a child's behalf. By contrast, working-class parents tend to allow their children a great deal of free play, use many directives in conversations with their children, and rarely interact with the school (Lareau, 2002). According to Lareau, these differences in parenting represent a key mechanism through which higher status parents transmit their advantages to their children by increasing their children's school success. Being raised under concerted cultivation teaches children cognitive and noncognitive skills, which are beneficial in school, for instance, in interactions with teachers (Calarco, 2014; Lareau, 2002).

Quantitative studies have tried to map the concept of concerted cultivation with survey data (Cheadle & Amato, 2011). Indeed, these studies have shown that concerted cultivation mediates parts of the relationship between parents' socio-economic status and children's academic skills (Bodovski & Farkas, 2008; Cheadle, 2008; Covay & Carbonaro, 2010; Dumais, 2006). However, little research has examined Lareau's concepts about parenting strategies outside Anglo-Saxon countries (e.g., France: Coulangeon, 2018; Japan: Matsuoka et al., 2015; Sweden: Sjödin and Roman, 2018). Hence, the extent to which her theoretical considerations apply to other cultural contexts, such as Germany, remain largely unknown. Furthermore, most studies have focused on the parenting of school children (Bodovski & Farkas, 2008; Covay & Carbonaro, 2010; Dumais, 2006) or have used samples of children of a larger age range (Cano et al., 2019; Hsin & Felfe, 2014) so that we know little about concerted cultivation specifically during preschool age.

### 3.2.2 *Concerted cultivation in the form of enrollment in organized leisure activities*

According to Lareau, one of the most salient differences between "concerted cultivation" and "accomplishment of natural growth" is the organization of children's daily lives. Middle-class parents tend to enroll their children in several adult-orchestrated organized leisure activities and thereby establish very structured daily routines. Structured organized leisure activities resemble classroom settings in several

ways (e.g., regularity, clear rules, adult guidance) so that enrollment in organized leisure prepares children for learning in class. Hence, by participating in organized leisure activities, children do not only develop their cognitive skills through stimulation, but they also learn how to follow rules, perform in front of an audience, or interact with authorities (Lareau, 2003). Furthermore, persistence and a strong work ethic are the kinds of skills that are trained in organized leisure settings. Such skills provide benefits for children in the classroom setting (Covay & Carbonaro, 2010). Whereas the accomplishment of natural growth, in the form of unstructured free play, also allows children to develop skills such as creativity and peer conflict resolution, these skills do not result in the same benefits in school (Lareau, 2003). Hence, whereas both parenting strategies lead to children's skill development, the middle-class parenting strategy is more effective in teaching children the skills with the largest pay-off in the school setting.

In line with Lareau's theory, there is compelling evidence that school children's enrollment in organized leisure activities is related to parents' socio-economic status (Bodovski & Farkas, 2008; Carolan, 2016, 2018; Cheadle & Amato, 2011; Coulangeon, 2018; Dumais, 2006). Furthermore, studies have shown that school children's enrollment in organized leisure activities is related to higher school outcomes (Eccles et al., 2003; Mahoney et al., 2003) such as test scores (Dumais, 2006), teacher ratings (Dumais, 2006), and school grades (Coulangeon, 2018; Redford et al., 2009). Whereas Lareau based her argument on the number of organized leisure activities, some studies on concerted cultivation have analyzed distinct organized leisure activities rather than a mere sum score (Coulangeon, 2018; Dumais, 2006). This research



suggests that not all organized leisure activities contribute to children's skill growth to the same extent. For instance, Coulangeon (2018), using a sample of 6th graders in France, showed with a fixed-effects regression that only three (public library membership, enrolling in a music academy or school of music, and participating in an activity club at school) out of eight organized leisure activities under scrutiny were related to higher grades in math and French.

The most commonly studied organized activities are sports and music participation. For both types of organized leisure activities, there is evidence that they support school success (Cabane et al., 2016; Felfe et al., 2016; Pfeifer & Cornelißen, 2010; Southgate & Roscigno, 2009). However, these two types of activities differ in several respects and may therefore support school success via distinct channels (e.g., development of cognitive vs. noncognitive skills). It is a common argument of researchers who focus on the benefits of organized sports participation that sports influences educational outcomes indirectly through a multitude of channels ranging from health, to soft skills (e.g., teamwork, dealing with criticism and competition, following rules and instructions), to behavioral habits (e.g., motivation, discipline, perseverance; (Felfe et al., 2016; Pfeifer & Cornelißen, 2010). Studies focusing on music, by contrast, have usually argued more in terms of the development of cognitive skills: Music training stimulates cognitive abilities such as intelligence (Schellenberg, 2004), auditory discrimination abilities (Forgeard et al., 2008), verbal memory (Ho et al., 2003), and executive functioning (Moreno et al., 2011). Nevertheless, being musically active may also be related to noncognitive skills such as openness to experience (Cabane et al., 2016). Cabane et al. (2016) examined

with a propensity score matching analysis whether music and sports contribute to school success via the same mechanisms and concluded that regarding basic cognitive skills in particular, adolescents' music activities seem to have a higher payoff than participating in sports. The positive association between music activities and cognitive skills has also been found using an experimental design (Kaviani et al., 2014; Rauscher et al., 1997; Schellenberg, 2004). Yet, a meta-analysis of experimental studies concludes that impact of music training on children's and young adolescents' cognitive and academic skills is rather small and is moderated by study quality (Cohen's  $d = 0.16$ ; Sala and Gobet, 2017). However, these researchers also report that the effect of music training varies by outcome measure. For intelligence, for instance, they found an effect size of Cohen's  $d = 0.35$ .

While there is compelling evidence that school children's enrollment in organized leisure activities contributes to their skill development, less research has focused on organized leisure enrollment during preschool years. Yet, it seems plausible that the child-rearing strategies described by Lareau also shape the leisure time experiences of preschool children. A 5-year-old's leisure time is likely to be much more influenced by his or her parents' wishes compared to school children, who are experiencing the growing influence of their peers (Hofferth, 2008). Moreover, participating in organized leisure activities during early ages may be particularly beneficial for cognitive skill development. Research has suggested that brain sensitivity to the development of several cognitive skills is largest at a young age (National Scientific Council on the Developing Child, 2007). In the age of intensive parenting (Hays, 1996; Schaub, 2010), there seems to be an upward trend of

already enrolling children in organized leisure activities at a young age (Lareau, 2008, 2011; Schmidt et al., 2017).

Several studies suggest that concerted cultivation as a parenting strategy of the higher social classes is already visible during early childhood. These studies found that parents' socio-economic status is related to young children's enrollment in organized leisure activities (Carolan, 2018; De Moll & Betz, 2014; Gülzau, 2018; Schmiade & Spieß, 2010; Schober & Spieß, 2013; Sjödin & Roman, 2018). Yet, few studies have examined the extent to which children's enrollment in organized leisure activities at a young age contributes to greater growth in their cognitive skills. For instance, Carolan's (2018) analysis of U.S. preschoolers showed that the number of organized leisure activities of children during the year prior to first grade was related to their first grade math and reading scores. In contrast, Hsin and Felfe (2014) who analyzed a sample of U.S. children between 0-12 years using a fixed-effects estimation, found no significant relationship between time spent in organized activities and cognitive skill measures. Yet, they found a positive relationship between time spent in organized leisure activities and behavioral outcomes for children older than six years. Similarly, Cano et al. (2019) did not report any significant relationship between time spent in structured activities and vocabulary test scores using value-added models using time diaries of Australian children (4-8 years old). However, these studies used a sum score of all organized leisure activities or time spent in all organized activities, which can hide the potential differential effects of single organized leisure activities, as reported by studies on school children. Hence, the extent to which the specific organized leisure activities during early

childhood contribute to skill differences and thereby transmit social class advantages remains unclear.

### 3.2.3 *Concerted cultivation in the form of cognitive stimulation at home*

Besides Lareau's observation of the high degree of enrollment in organized leisure activities in middle-class families, she also observed that middle-class parents, in contrast to working class parents, were more likely to provide cognitive stimulation at home. This is because these parents perceive an obligation to actively develop their child's skills (Lareau, 2011). In particular, when applying the concept of concerted cultivation to the context of early childhood, this dimension of concerted cultivation may be one of the most salient dimensions on which parents of distinct socio-economic backgrounds differ. In line with this, the family investment model suggests that a key channel through which parents transmit their social class status is parental cognitive stimulation at home (Becker & Biedinger, 2016; Becker & Tomes, 1986; Bradley & Corwyn, 2002; Conger & Dogan, 2007; Feinstein et al., 2008; Guo & Harris, 2000). Hence, we argue that in early childhood, the parenting strategy of concerted cultivation (i.e., parents' urge to develop children's talents and improve children's skills at every occasion) may not only be visible in the core dimensions mentioned by Lareau but also in the extent to which parents stimulate their children on a cognitive level at home (Bodovski, 2010; Kaiser & Diewald, 2014; Pensiero, 2011).

Indeed, there is a long-standing tradition in early childhood research examining to which extent the home learning environment explains skills differences in children by parental socio-economic status. This research shows that parents with higher socio-economic status provide their young children with a more cognitively stimulating home environment (e.g., reading to the child, helping the child learn colors, engaging in frequent conversations with the child) and thereby secure them a head-start at school (Anders et al., 2012; Duncan et al., 1994; Guo & Harris, 2000; Kluczniok & Mudiappa, 2018; Melhuish et al., 2008; Niklas & Schneider, 2017). Whereas older studies focused on the role of the home environment as a set of diverse activities (Duncan et al., 1994; Melhuish et al., 2008) or as time spent with parents (Milkie et al., 2015), more recent studies have emphasized that only certain activities in the home environment (e.g., educational parent-child activities) contribute to skill development (Cano et al., 2019; Fiorini & Keane, 2014; Hsin & Felfe, 2014). For instance, Hsin and Felfe (2014) used a fixed-effects approach and found that parent-child time in educational activities was significantly related to children's cognitive abilities, whereas parent-child time spent on unstructured activities was not. The underlying assumption of this literature is similar to Lareau's argument about organized leisure activities: structured activities along with adult-guidance may generate larger benefits for school-relevant outcomes than unstructured activities (Hsin & Felfe, 2014).

### 3.2.4 *Enrollment in organized leisure activities versus cognitive stimulation at home*

Whereas studies have examined the benefits of organized leisure activity enrollment and parental cognitive stimulation at home, few studies have shed light on their relative importance regarding the development of early-age skill differences by parental socio-economic background. These studies show that it is rather the engagement in cognitively stimulating activities (e.g., reading to the child) that generates beneficial outcomes for children and not the sum of organized leisure activities (Cano et al., 2019; Fiorini & Keane, 2014; Hsin & Felfe, 2014; Pensiero, 2011). However, Funk and Kemper's (2016) study, which examined single organized leisure activities instead of a sum score, found that enrolling in music lessons and not the factor score of home learning environment was the best predictor of math scores. A potential explanation for these contradicting results might be that not all forms of organized leisure activities or parental cognitive stimulation contribute to cognitive skill development. Therefore, it is necessary to distinguish specific activities for both forms of parental investment when studying their relative importance for children's skill development.

## 3.3 CONCERTED CULTIVATION IN THE CONTEXT OF GERMANY

Most of the research on concerted cultivation has been conducted in the U.S. (Bodovski & Farkas, 2008; Cheadle, 2008; Covay & Carbonaro, 2010; Dumais, 2006) or other Anglo-Saxon countries (Fiorini & Keane,

2014; Lee et al., 2019). However, the resources that are needed by and available to parents to follow a parenting style of concerted cultivation may vary by country. For instance, concerning parents' time constraints, it is important to note that most of the main caregivers in Germany are mothers who are homemakers or work part time. This usually leaves enough time for stimulating activities at home and taking children to leisure activities outside the home (German Federal Ministry for Family Affairs, Senior Citizens, Women, 2012).

In particular, concerted cultivation in the form of organized leisure activity enrollment may be influenced by country-specific conditions such as costs and opportunity structures of organized leisure activities. Organized leisure activities have a long tradition in Germany and are primarily organized in institutions (e.g., music schools, sports clubs) separate from early childhood education and care institutions (ECEC). Hence, all day-care facilities exert very limited control over organized leisure activities, leaving the choice about enrolling children in organized leisure activities to the parents. In Germany, 95,6% of children between the ages of 4 and 5 attend day-care facilities before transitioning to elementary school at the age of 6 (Strunz, 2013). Yet, more than half of the children in Germany in 2011 attended them for a maximum of seven hours a day, leaving enough time for many children to also enroll in various leisure activities (Strunz, 2013). In contrast to other countries, financial constraints for enrolling in organized leisure activities are less pronounced in Germany. For instance, organized leisure activities are strongly subsidized so that the participation fees are rather low (Breuer, 2015; VDM, 2011). In addition, in 2011, the German government passed a law ("*Bildungs- und Teilhabepaket*") to

increase educational support to low-income households by covering membership fees or equipment costs (up to 10 Euro per month) for activities such as music or sports. At the same time, the distribution of household income in Germany is less unequal than, for instance, in the U.S. context. Therefore, in particular, in the German context, cultural orientations (i.e., parents' education) rather than financial or time constraints are likely to influence parents' child-rearing behavior (Cabane et al., 2016).

### 3.4 THE PRESENT STUDY

In our study, we applied Lareau's concept of concerted cultivation to preschoolers who transition to elementary school. We bridge the two theoretical approaches of concerted cultivation and parental investment by extending the concept of concerted cultivation to the dimension of parental cognitive stimulation at home. Specifically, we aimed to test the following hypotheses:

**Hypothesis 1a:** Parents' socio-economic background will be positively associated with enrolling preschool children in organized leisure activities.

**Hypothesis 1b (mediation):** Enrolling preschool children in different types of organized leisure activities will mediate the effect of parents' socio-economic background on later differences in cognitive skills.



**Hypothesis 2a:** Parents' socio-economic background will be positively associated with parental cognitive stimulation at home for preschoolers.

**Hypothesis 2b (mediation):** Parental cognitive stimulation will mediate the effect of parents' socio-economic background on later differences in cognitive skills.

Testing these hypotheses advances previous research in several aspects. First, we tested the extent to which Lareau's theory can be generalized to other cultural contexts and age groups using data on preschool children enrolled in German early education institutions. Second, we tested whether concerted cultivation as a parenting strategy of higher educated parents during the preschool phase would be reflected by an additional dimension, i.e., parental cognitive stimulation at home. Third, we differentiated between specific activities because critics of Lareau's work have argued that specific parenting behaviors rather than the complete set of behaviors may drive the skill gap between children from different family backgrounds (Pensiero, 2011). Thereby, we contribute to the knowledge about the relative importance of learning in two different contexts (at home with parents and in organized leisure activities). Finally, we measured cognitive skills not only with academic test scores but also with measures of reasoning and concentration abilities.

### 3.5 DATA AND METHODS

#### 3.5.1 *Data*

The following analyses were based on data from the German National Educational Panel Study (NEPS, doi:10.5157/NEPS:SC2:6.0.1; Blossfeld et al., 2011), which applies a multicohort sequence design in order to shed light on lifelong educational processes. For the current study, we focused on the Starting Cohort 2 “Kindergarten” (preschool care), which includes rich data from a sample of children in day-care facilities (Kindergartens) in Germany. The sample was drawn using an indirect sampling strategy because there is no central register of German day-care facilities from which a random sample of enrolled children could be drawn. First, elementary schools were sampled on a nationwide and representative basis. These schools provided a list of day-care facilities from which children could transfer to these particular elementary schools. Second, a set of day-care facilities was randomly drawn from this list for each school in proportion to the school size. 33% of the contacted day-care facilities participated in the study. All 4-year-old children and their parents from the participating day-care facilities were invited to participate (Skopek et al., 2012). The data contains information from a standardized test of children’s cognitive skills, from a parent questionnaire and from a questionnaire administered to the day-care teachers. The baseline sample can be regarded as roughly representative of German children at the age of 4 to 5 years because over 95,6% of the children in this age group attended day-care facilities in 2011 (Strunz, 2013).

Data collection started in 2011 when the children were about 4 years old. The data set provides comprehensive information about the children's learning environments at home and in the day-care facilities as well as their competence development, which rendered the data set well suited for testing our hypotheses. We used general information about the household structure and family resources, child's sex, age and health condition from the parent questionnaire of Wave 1 (at age 4). The information about children's leisure activities and children's cognitive outcomes was included in the data collection of Wave 2 (at age 5) and Wave 4 (at age 7). Most of the items we used for our study were included in the questionnaire every other wave, so that Wave 3 does not contain all measures of interest. We therefore used a data structure that resembles a two-wave panel although we use three waves of the data (a detailed description of all variables follows below). In Wave 1, 2996 children were interviewed, which corresponds to a response rate of 56.2% (Skopek et al., 2012). We restricted our analytic sample to children without a diagnosed disability (N= 30) who attended regular day-care facilities. For our analyses, we used only cases that include a completed parent questionnaire in Wave 1 and Wave 2 (N=1,632). Between Waves 2 and 3, the children changed from institutional early childhood care to elementary school. Due to the study design, only children in previously selected elementary schools were followed in Wave 3. This led to a reduction in the sample size from 1,632 (Wave 2) to 393 (Wave 3) children. Due to further non-response, in Wave 4, a total of 343 children were left in the sample that builds the sample for our mediation analysis which relies on panel data. Due to the large reduction in the sample size between Wave 2 and 4, the sample for the analysis of children's cognitive skills may no longer be

representative of the German population of children enrolled in all day-care facilities. A comparison of the descriptives (see Appendix Table A1, A2) and an analysis of the attrition showed that the the respondents who remain in the sample are more privileged (see Appendix Table A5). The children in the sample of the mediation analysis were less often from a single parent family and engaged less frequently in educational activities at preschool. Also these children were less likely to have a migration background but were more likely to be enrolled in sports and had higher math scores. This limitation should be kept in mind when drawing conclusions from the results because it may have downward biased the coefficients of our concerted cultivation indicators. Our final sample of parents and children consisted of  $N = 1,632$  (Waves 1 and 2) and  $N = 343$  (Waves 1, 2, and 4). We imputed item-missing data using chained equations (20 imputations, STATA 14, command: `mi impute chained.`). The largest amount of missing data occurred for the household income item (13.8%). For further information on the missing data, see Table A1 in the Appendix.

### 3.5.2 *Variables*

Descriptive statistics of all variables can be found in the Appendix (Tables A1 and A2).

#### *Core variables*

We used three dependent variables to measure children's cognitive skills: children's math skills, concentration skills, and basic reasoning

skills. All skill measures were standardized and measured in Waves 2 and 4.

Math skills were measured with a weighted maximum likelihood estimator (WLE; Warm, 1989) from a standardized math competence test developed for preschool children by NEPS. This test was developed to capture the ability to apply mathematics in realistic situations. The test consisted of 26 items covering four content areas (quantities, change and relationships, shape and spaces, data and chance) and six competence areas (arguing, communicating, modelling, problem solving, representing, applying technical skills (for details see Neumann et al., 2013; Schnittjer & Duchardt, 2015)). The children were tested in one-on-one situations where the interviewer reads the items to the child and sometimes illustrates the task using illustrative materials (e.g., stones to count).

Reasoning skills were measured as part of children's basic (nonverbal) cognitive abilities. The standardized test (NEPS-MAT) consisted of two sets each with six items (for details see Haberkorn & Pohl, 2013). Each item consisted of a matrix of geometrical elements with only one field remaining empty. The child has to deduce the logical rule on which the pattern of the geometrical elements is based in order to select the right complement for the empty field from the offered solutions. The child had three minutes to solve each set.

Concentration skills were measured with the day-care teacher's response to the question "Compare <target child's name> with other children of the same age: Is <target child's name> stamina and ability to concentrate (e.g., ability to do something for long periods of time)

much worse, slightly worse, the same as, slightly better, or much better than other children of his/her age?" The response categories ranged from 1 (*much worse*) to 5 (*much better*).

We measured concerted cultivation with two forms of parental investments, each measured with a set of several items: enrolling children in organized leisure activities (4 items) and parental cognitive stimulation at home (6 items). Organized leisure activities were measured in Wave 2 (at the age of five) by asking parents whether their child was currently taking part in regular activities outside preschool. The regular leisure activities items in the questionnaire were sporting activities (e.g., gymnastics, swimming, sports clubs, riding lessons), musical activities (e.g., music lessons, music clubs, music school), language courses to learn a foreign language, and other activities (e.g., painting, ballet). Overall, sport was the most popular activities for the 5-year-olds, followed by music, other activities, and foreign language courses. We collapsed language courses with the "other" category because language course participation was very rare. For the analyses we hence use the three activities sport, music and "other activities".

Parental cognitive stimulation at home was measured with parents' self-reports of how often they engaged in learning activities with their children at home. We used data from Wave 2, containing information on the following six activities: reading to the child, painting/crafts/drawing, activities with letters, activities with numbers, teaching poems/rhymes/songs, and visiting the library. Due to skewed distributions, we collapsed the eight response categories into two (daily and less than daily). Overall, parent-child reading was the most popular activity with 73% of parents reading to their children on

a daily basis. We decided to exclude the library item because it was a very rare activity at this age and therefore not well suited for measuring parental cognitive stimulation in young children (Aminipour et al., 2018).

#### *Independent variables*

We measured family socio-economic status with a dummy variable that indicated whether at least one of the parents had a tertiary education degree (Wave 1). We used a single indicator of socio-economic background rather than a composite score because results tend to differ depending on the indicator used (Duncan & Magnuson, 2003; Linberg, 2017). We focused on parental education for theoretical and empirical reasons. In accordance with Weininger et al. (2015), parental education best captures different cultural orientations rather than mere objective resources or constraints. Parental education is a very good marker for parents' values and beliefs from which their parenting strategies derive (Bradbury et al., 2015). Furthermore, previous research has often shown that parental education is one of the most reliable predictors of differences in parenting (Duncan & Magnuson, 2003; Hoff et al., 2002). In addition, parental education is very stable during individual life courses, compared to income or occupation, which may fluctuate across time, especially in a family with young children. We constructed the dummy on the basis of the CASMIN classification, which is an established measure for capturing school and vocational qualifications (König et al., 1988). A more fine-grained differentiation that also included a middle-level education category was not possible

due to the small number of observations in the category of low-level education.

### *Controls*

In order to reduce bias from omitted variables, we considered several child-level controls, mostly measured in Wave 1: a subjective measure of children's overall health (parent report), children's educational activities at the day-care facilities (caregiver report, sum score of five items: looking at picture books, comparing and sorting, construction games, puzzles, number games), child's age (in months), and child's gender (1 = female).

We also included the following family-level controls: equivalized household income (OECD modified scale, logarithm, in steps of 1,000 Euros), the migration background of the responding parent (= 1 if the parent or one of the grandparents was born outside Germany), number of siblings in the household (Wave 2), resident in West Germany, single parent (= 1 if a parent lived alone in a household, Wave 2), and mothers' weekly working hours (Wave 2).

### 3.5.3 *Analytic approach*

Our first step was a general descriptive overview of bivariate associations (group comparisons using percentage point differences and mean comparisons) between the core variables. In a second step, we applied multivariate regression models that allow us to control for potential



endogeneity bias. In the first part of our multivariate regressions we examined the relationships between parents' socio-economic status, organized leisure activities, and parental cognitive stimulation. To this end, we used data from Waves 1 and 2. The analytic sample included 1,632 children enrolled in German day-care facilities. To test Hypotheses 1a and 2a, we applied logistic regressions to predict children's probabilities of being enrolled in organized leisure activities and of receiving daily cognitive stimulation from parental background factors. To reduce any confounding bias, we included parental migration background, household income, mothers' working hours, number of siblings in the household, and children's health in the models because they were likely to be correlated with parents' education and our dependent variables. We also controlled for children's age and gender in the models. The logistic regression to test Hypotheses 1a and 2a takes the following form:

$$\text{Logit}(\text{ConCul}_t) = \beta_0 + \text{SES}_{(t-1)} + \beta_1 X_{(t-1)} + e_t \quad (1)$$

where subscript  $t$  refers to the time period;  $\text{ConCul}_t^*$  represents the probability to carry out the examined parental concerted cultivation activity;  $\beta_0$  refers to the model intercept;  $\text{SES}_{(t-1)}$  denotes parental socio-economic status;  $X_{(t-1)}$  is a vector of control variables; and  $e$  is the random error term.

In the second part of our multivariate analysis, we examined the extent to which enrolling in organized leisure activities and parental cognitive stimulation mediates the effect of parents' education on children's cognitive skill differences. Therefore, we used measures of the dependent variables from Wave 4, but due to the panel attrition,

our analyses were based on a smaller sample of 343 children. In order to test our mediation hypotheses 1b and 2b, we estimated separate linear regressions for each of the three outcomes. We included the Wave 2-measure of all dependent variables (lagged dependent variable (LDV) approach, also known as value-added approach). By doing so, we model the association between the independent variables and the growth of individual skills between Wave 2 and Wave 4. The LDV approach has the advantage that it reduces unobserved baseline differences between the children in our sample. This allows us to approximate the association of concerted cultivation with cognitive skills, net of individual advantages that were present already before age 5. The model for each cognitive skill outcome was built in three steps. First, we estimated the relationship between parental education and cognitive skills ( $CogSkill_t$ ) controlling for a lag of the dependent variable ( $CogSkill_{(t-2)}$ ), parental migration background, living in West Germany, child gender and age  $X_{(t-3)}$ :

$$CogSkill_t = \beta_0 + SES_{(t-3)} + \beta_1 X_{(t-3)} + \beta_2 CogSkill_{(t-2)} + e_t \quad (2)$$

In a second step, we added more control variables, which may function as a mediator of the relationship between parental education and cognitive skills but at the same time represent potential confounders for the relationship between organized leisure activities and cognitive skills. This additional vector of control variables ( $Z_{(t-3)}$ ) consisted of the following variables: household income, single parenthood, mothers' working hours, siblings in the household, children's educational

activities at the day-care center, child health. The second step of the step-wise regression takes the following form:

$$\begin{aligned} CogSkill_t = \beta_0 + SES_{(t-3)} + \beta_1 X_{(t-3)} + \beta_2 Z_{(t-3)} + \beta_3 CogSkill_{(t-2)} \\ + e_t \end{aligned} \quad (3)$$

In a third step, we included a vector of our mediator variables (*ConCul*<sub>(*t*-2)) into the model:</sub>

$$\begin{aligned} CogSkill_t = \beta_0 + SES_{(t-3)} + \beta_1 X_{(t-3)} + \beta_2 Z_{(t-3)} + \beta_3 CogSkill_{(t-2)} \\ + ConCul_{(t-2)} + e_t \end{aligned} \quad (4)$$

To test the indirect effect of parents' socio-economic status on children's cognitive skills via concerted cultivation, we used the STATA command *khb* (Kohler et al., 2011), as it facilitates calculating the size and statistical significance of the mediation effect.

For all our models, we used clustered standard errors to account for the fact that the children were nested in day-care facilities. For all analyses that were based on Waves 1 and 2, we applied a survey weight provided by NEPS (longitudinal weight for the joint participation of parents and children: *w\_tp12*). Given the large attrition rate at the transition to primary school, which is responsible for the sample reduction between Wave 2 and 4, the NEPS team pointed out in personal communication that the survey weights are unlikely to fully compensate for the selectivity in the remaining sample. We therefore decided against applying survey weights for the analyses based on the smaller sample. Instead, we examined the predictors of this attrition at Wave 3 and included variables that were related to sample dropout (e.g., single parenthood, parents' migration background) in the model

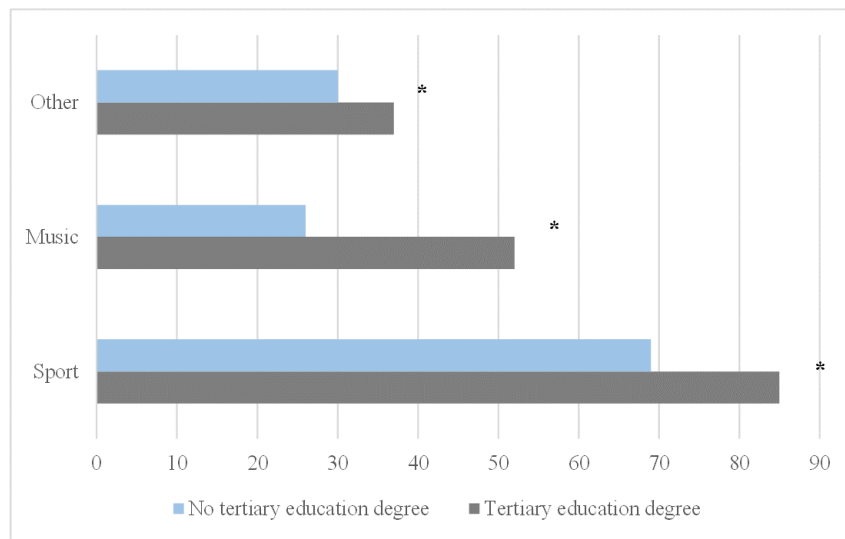
to reduce bias. Furthermore, we reflected on the implications of the selective attrition for the generalizability of our results in the discussion section.

## 3.6 RESULTS

### 3.6.1 *Bivariate results*

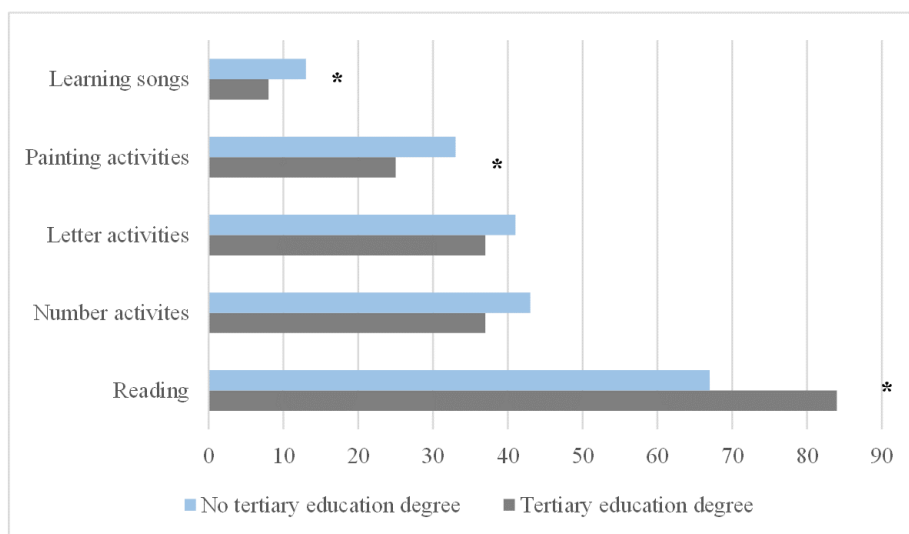
To provide the first insights into our data, we show the percentages of children enrolled in three organized leisure activities by parents' education using the observed data (Figure 3.1). Across all activities, children from higher educated families had significantly higher enrollment rates. The largest difference occurred for enrollment in music activities: 52% of children from higher educated families were enrolled in organized music activities, compared to 26% of children from families with lower education. In contrast to our expectations, we did not observe that children from higher educated families were engaged in cognitively stimulating activities significantly more often, except for daily reading to the child (Figure 3.2). We observed that 84% of the higher educated families reported daily reading, compared to 67% of the families with lower education. However, we found that families with lower education significantly more often reported that they practiced singing or painting with their children daily, compared to families with higher education.

In a second step, we examined the mean differences in cognitive skills by parental education, children's enrollment in organized leisure ac-



**Figure 3.1:** Percentages of children enrolled in organized leisure activities (Wave 2) by parental education.

*Note.* Based on weighted observed data.  $N_{\text{Sports}} = 1,625$   $N_{\text{Music}} = 1,624$   $N_{\text{Other}} = 1,624$ . \*Indicates significant differences between groups at  $p < .05$ . Significance tests were based on an F-statistic equivalent to Pearson chi-squared statistic corrected for survey weights (Rao & Scott, 1984).



**Figure 3.2:** Percentages of children who were given daily cognitively stimulating activities (Wave 2) by parental education.

*Note.* Based on weighted observed data.  $N_{\text{Reading}} = 1,632$   $N_{\text{Number}} = 1,628$   $N_{\text{Letter}} = 1,629$   $N_{\text{Paint}} = 1,632$   $N_{\text{Songs}} = 1,630$ . \*Indicates significant differences between groups at  $p < .05$ . Significance tests were based on an F-statistic equivalent to Pearson chi-squared statistic corrected for survey weights (Rao & Scott, 1984).

tivities, and daily parental cognitive stimulation (Table A3). We used the cognitive skill scores from Wave 4 (N=343). As expected, parental education was significantly and positively related to all three cognitive skill measures. Furthermore, our results showed that, on average, children who were enrolled in organized music activities had significantly higher values on all cognitive skill measures compared to children who were not enrolled. The largest mean difference existed in math scores (.522 SDs), closely followed by differences in reasoning (.460 SDs), and concentration (.413 SDs). Similarly, children who were enrolled in organized sporting activities had higher means on all cognitive skill measures compared to children who were not enrolled. Yet, only the mean differences in math and concentration skills were statistically significant (.533 and .252 SDs, respectively). Being enrolled in any other activity was only significantly related to higher concentration abilities (.220 SDs). Regarding parents' promotion of cognitively stimulating activities, we found that only daily parent-child reading was significantly related to higher means in math, reasoning, and concentration skills (.401, .341, .311 SDs, respectively).

### 3.6.2 *Multiple regression analyses*

#### *Enrollment in organized leisure activities and parents' promotion of cognitive stimulation by parents' socio-economic status*

In the first part of the multiple regression analyses, we estimated a logistic regression for each concerted cultivation indicator to test Hypotheses 1a and 2a. Table 3.1 presents the average marginal effects

of parental background characteristics on enrollment in organized sports, music, or any other activity at the age of five. In line with Hypothesis 1a, the results showed that, on average, children from higher educated families were around 9 percentage points more likely to be enrolled in organized sporting activities and around 19 percentage points more likely to be enrolled in organized music activities than children of lower educated parents. Regarding children's enrollment in any other organized leisure activity, we did not find significant differences between children from families with higher and lower levels of education.

Table 3.2 shows the average marginal effects of parental background characteristics on five distinct parent-guided cognitively stimulating activities, which represented our second measure of concerted cultivation. As stated in Hypothesis 2a, we expected that higher educated parents were more likely to frequently offer their children cognitively stimulating activities at home. On average, 5-year-olds from higher educated families were around 12 percentage points more likely to be read to daily. This was in line with our expectations. Yet, these families were significantly less likely to teach their children songs or to play number games with their children on a daily basis. Unexpectedly, we did not find significant differences in cognitively stimulating activities with letters by parents' education.

*Enrollment in organized leisure activities and parental cognitive stimulation as mediators*

In the second part of our analysis, we tested our mediation Hypotheses 1b and 2b by estimating lagged dependent variable (LDV) regressions for each of our three cognitive skill measures (Table 3.3). As we showed in the first part of the analysis, parents' education was positively related only to enrolling children in sports, enrolling children in music, and daily reading to the child. Hence, only these three forms of parental investment were potential mediators that might explain skill differences in children from families with varying educational degrees. Therefore, the following analyses focused only on these three potential mediators.

We tested the proposed mediation with stepwise regressions. First, we estimated the relationship between parental education and cognitive skills while controlling for the baseline heterogeneity (skill measure from Wave 2), migration background, living in West Germany, gender and age of child (Models 1, 4, and 5). Children of higher educated parents showed a stronger growth in math and reasoning skills between Wave 2 and Wave 4. For instance, the background-specific difference in growth of children's math skills was .389 standard deviations (SDs). By contrast, parents' education did not predict growth in concentration skills. Second, we included additional covariates that may represent potential common causes of our mediator and dependent variables into the models (Models 2, 5, and 8). Some of these covariates represent also potential mediators of the relationship between parental education and children's cognitive skills which is reflected in the reduction of the



coefficient of parental education. Regarding other parental background factors, we observed a positive relationship between household income and children's reasoning and concentration skills. Parents' migration background was not significantly related to any growth in cognitive skills.

In a third step, we included our hypothesized mediators (i.e., organized sporting activities, organized music activities, and daily reading to the child) in the regression models (Models 3, 6, and 9). On average, enrolling in organized music activities was related to a .260 SD increase in mathematic skill-growth. Similarly, enrolling in music activities was positively related to growth in reasoning (.299 SD) and concentration skills (.224 SD). Neither enrollment in organized sports nor daily reading to the child was significantly associated with growth in any cognitive skill. In the models predicting growth in math and reasoning skills, we observed that the coefficient for parents' education level was reduced once the mediators were introduced (Models 3 and 6). However, neither enrollment in organized sports nor daily reading to the child was significantly associated with growth in any cognitive skill. This indicates that these activities are unlikely to act as mediator between parental background and cognitive skills. The only activity that renders significant effects on all three outcomes is music enrollment. This may indicate that music enrollment is a mediator of the association between parental background and math as well as reasoning. As there is no significant association between parental background and concentration which could be mediated, the question of mediation is obsolete. We nevertheless also observed a drop of the association between parental background and concentration once the

mediators were introduced. In the full model predicting reasoning skills (Model 6), the coefficient for parents' education was even rendered non-significant. This lends some support to Hypothesis 1b for music on math and reasoning, but not for concentration. Hypothesis 2b was not supported by the data as we do not observe an association between parent-child reading and cognitive skill growth.

As a final step, we computed the indirect effects to examine the magnitude and significance of the mediation through participation in organized music activities at the age of five (see Appendix, Table A4). Standard errors of the indirect effects were obtained using the delta method (Sobel, 1982) which is implemented using the KHB method (STATA command `khb`; Kohler et al., 2011). The indirect effect from parents' education to math skills via children's enrollment in music activities was significant at the 10% level. The same applied to the indirect effect from parents' education to basic reasoning skills via children's enrollment in music activities. Enrollment in organized music activities explained around 12% (i.e., indirect effect/total effect) of the relationship between parents' education and children's math skills and around 17% of the relationship between parents' education and children's reasoning skills. These results confirm our above support for Hypothesis 1b.

**Table 3.1:** Average marginal effects of family background predicting enrollment in organized leisure activities (logistic regression).

|  | Sports              | Music               | Other               |
|--|---------------------|---------------------|---------------------|
| Tertiary education degree<br>(family, yes = 1) | 0.092**<br>(0.034)  | 0.190***<br>(0.034) | 0.032<br>(0.037)    |
| <i>Control variables (family):</i>             |                     |                     |                     |
| HH income<br>(log, in 1,000)                   | 0.192***<br>(0.036) | 0.122**<br>(0.040)  | 0.098*<br>(0.044)   |
| Migration background<br>(yes = 1)              | -0.091*<br>(0.038)  | -0.061<br>(0.042)   | 0.031<br>(0.039)    |
| West Germany (yes = 1)                         | 0.203***<br>(0.035) | -0.007<br>(0.047)   | -0.062<br>(0.042)   |
| Mothers' working hours<br>(hr/week)            | -0.001<br>(0.001)   | -0.000<br>(0.001)   | -0.000<br>(0.001)   |
| No. siblings in hh                             | -0.045**<br>(0.014) | 0.013<br>(0.015)    | -0.055**<br>(0.018) |
| Single parent hh (yes = 1)                     | 0.082*<br>(0.038)   | 0.081<br>(0.054)    | 0.000<br>(0.047)    |
| <i>Control variables (child):</i>              |                     |                     |                     |
| Girl (yes = 1)                                 | 0.021<br>(0.030)    | 0.142***<br>(0.033) | 0.246***<br>(0.028) |
| Child's age (months)                           | -0.006<br>(0.003)   | 0.004<br>(0.004)    | -0.002<br>(0.004)   |
| Child's health                                 | -0.027<br>(0.023)   | -0.025<br>(0.023)   | 0.051*<br>(0.026)   |
| N  | 1,632               | 1,632               | 1,632               |

*Note.* Based on imputed and weighted data. Standard errors in parentheses

(clustered: day-care facility); hh=household.

*Source.* NEPS SC2 v6-o-1.

\* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$ .

**Table 3.2:** Average marginal effects of family background predicting stimulating activities at home (logistic regression).

|  | Reading            | Number activ.       | Letter activ.     | Teaching songs      | Painting           |
|--|--------------------|---------------------|-------------------|---------------------|--------------------|
| Tertiary educ. degree<br>(family, yes = 1) | 0.122**<br>(0.037) | -0.107**<br>(0.040) | -0.060<br>(0.037) | -0.057*<br>(0.028)  | -0.034<br>(0.039)  |
| <i>Control variables (family):</i>         |                    |                     |                   |                     |                    |
| HH income<br>(log, in 1,000)               | 0.103**<br>(0.039) | 0.105*<br>(0.043)   | 0.045<br>(0.044)  | 0.044<br>(0.029)    | -0.063<br>(0.048)  |
| Migration background (yes = 1)             | -0.072<br>(0.039)  | -0.014<br>(0.035)   | -0.002<br>(0.035) | 0.088***<br>(0.024) | 0.078*<br>(0.033)  |
| West Germany (yes = 1)                     | 0.073*<br>(0.030)  | -0.004<br>(0.047)   | 0.021<br>(0.044)  | 0.031<br>(0.033)    | 0.074<br>(0.043)   |
| (hr/week)                                  | -0.001<br>(0.001)  | -0.000<br>(0.001)   | 0.003*<br>(0.001) | -0.000<br>(0.001)   | 0.001<br>(0.001)   |
| No. siblings in hh                         | -0.024<br>(0.014)  | 0.006<br>(0.016)    | -0.012<br>(0.017) | 0.027*<br>(0.012)   | -0.003<br>(0.017)  |
| Single parent hh (yes = 1)                 | -0.070<br>(0.047)  | 0.002<br>(0.058)    | -0.002<br>(0.058) | 0.005<br>(0.041)    | 0.017<br>(0.058)   |
| <i>Control variables (child):</i>          |                    |                     |                   |                     |                    |
| Girl (yes = 1)                             | 0.036<br>(0.030)   | 0.034<br>(0.034)    | 0.079*<br>(0.031) | 0.049*<br>(0.023)   | 0.070*<br>(0.032)  |
| Child's age (months)                       | -0.000<br>(0.003)  | -0.012**<br>(0.004) | -0.002<br>(0.004) | -0.002<br>(0.003)   | -0.008*<br>(0.003) |
| Child's health                             | 0.001<br>(0.025)   | -0.005<br>(0.023)   | -0.044<br>(0.026) | 0.016<br>(0.021)    | -0.003<br>(0.024)  |
| N  | 1,632              | 1,632               | 1,632             | 1,632               | 1,632              |

*Note.* Based on imputed and weighted data. Standard errors in parentheses (clustered: day-care facility); hh=household.

*Source.* NEPS SC2 v6-0-1.

\*  $p < .05$ . \*\*  $p < .01$ . \*\*\*  $p < .001$ .

**Table 3.3:** LDV regression of children's cognitive skills (w<sub>4</sub>, std) on organized leisure (OA) and parent-child reading.

|                                       | Math (m1)           | Math (m2)           | Math (m3)           | Reasoning (m4)      | Reasoning (m5)      | Reasoning (m6)      | Concetr. (m7)       | Concetr. (m8)       | Concetr. (m9)       |
|---------------------------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|
| Tertiary educ. degree (family, yes=1) | 0.389***<br>(0.081) | 0.352***<br>(0.098) | 0.282**<br>(0.101)  | 0.307**<br>(0.097)  | 0.268*<br>(0.107)   | 0.220<br>(0.111)    | 0.140<br>(0.109)    | 0.023<br>(0.117)    | -0.048<br>(0.122)   |
| <i>Mediators:</i>                     |                     |                     |                     |                     |                     |                     |                     |                     |                     |
| Sports (w2)                           |                     |                     | 0.103<br>(0.115)    |                     |                     | -0.111<br>(0.139)   |                     |                     | 0.053<br>(0.172)    |
| Music (w2)                            |                     |                     | 0.260**<br>(0.097)  |                     |                     | 0.299*<br>(0.120)   |                     |                     | 0.224*<br>(0.107)   |
| Reading to child (w2)                 |                     |                     | 0.071<br>(0.104)    |                     |                     | 0.054<br>(0.155)    |                     |                     | 0.131<br>(0.132)    |
| <i>Control variables (family):</i>    |                     |                     |                     |                     |                     |                     |                     |                     |                     |
| HH income (log, in 1000)              |                     | 0.242*<br>(0.118)   | 0.206<br>(0.119)    |                     | 0.291<br>(0.166)    | 0.268<br>(0.168)    |                     | 0.404**<br>(0.146)  | 0.368*<br>(0.145)   |
| Migration background                  | 0.110<br>(0.118)    | 0.145<br>(0.111)    | 0.167<br>(0.110)    | -0.009<br>(0.168)   | 0.061<br>(0.168)    | 0.084<br>(0.169)    | -0.143<br>(0.156)   | -0.105<br>(0.156)   | -0.079<br>(0.155)   |
| West-Germany (yes=1)                  | 0.137<br>(0.120)    | 0.096<br>(0.128)    | 0.056<br>(0.134)    | 0.324*<br>(0.151)   | 0.226<br>(0.163)    | 0.229<br>(0.154)    | 0.073<br>(0.113)    | 0.052<br>(0.120)    | 0.014<br>(0.122)    |
| Mothers' working hours (h/week)       |                     | -0.004<br>(0.003)   | -0.003<br>(0.003)   |                     | -0.007<br>(0.004)   | -0.006<br>(0.004)   |                     | -0.002<br>(0.004)   | -0.001<br>(0.004)   |
| No. siblings in hh                    |                     | -0.070<br>(0.053)   | -0.072<br>(0.051)   |                     | -0.078<br>(0.061)   | -0.092<br>(0.059)   |                     | -0.027<br>(0.058)   | -0.024<br>(0.058)   |
| Single parent hh (yes=1)              |                     | 0.017<br>(0.163)    | 0.009<br>(0.172)    |                     | 0.200<br>(0.279)    | 0.182<br>(0.279)    |                     | -0.105<br>(0.265)   | -0.103<br>(0.269)   |
| <i>Control variables (child):</i>     |                     |                     |                     |                     |                     |                     |                     |                     |                     |
| Girl                                  | -0.020<br>(0.085)   | -0.033<br>(0.085)   | -0.080<br>(0.088)   | -0.041<br>(0.103)   | -0.036<br>(0.100)   | -0.065<br>(0.104)   | 0.413***<br>(0.093) | 0.393***<br>(0.094) | 0.361***<br>(0.102) |
| Child's age (month)                   | -0.016<br>(0.011)   | -0.017<br>(0.011)   | -0.018<br>(0.011)   | -0.008<br>(0.012)   | -0.012<br>(0.012)   | -0.013<br>(0.012)   | 0.003<br>(0.014)    | -0.000<br>(0.014)   | -0.001<br>(0.014)   |
| Educ activities (sum, preschool)      |                     | 0.014<br>(0.010)    | 0.013<br>(0.010)    |                     | 0.021<br>(0.012)    | 0.018<br>(0.012)    |                     | 0.026**<br>(0.010)  | 0.024*<br>(0.010)   |
| Child's health                        |                     | -0.018<br>(0.079)   | -0.001<br>(0.080)   |                     | -0.091<br>(0.098)   | -0.075<br>(0.099)   |                     | 0.108<br>(0.085)    | 0.119<br>(0.086)    |
| <i>Lagged dependent variable:</i>     |                     |                     |                     |                     |                     |                     |                     |                     |                     |
| Math (w2, std, WLE)                   | 0.559***<br>(0.050) | 0.525***<br>(0.049) | 0.506***<br>(0.050) |                     |                     |                     |                     |                     |                     |
| Cognitive abilities (w2, std)         |                     |                     |                     | 0.254***<br>(0.045) | 0.239***<br>(0.045) | 0.226***<br>(0.044) |                     |                     |                     |
| Concentration (w2, std)               |                     |                     |                     |                     |                     |                     | 0.287***<br>(0.058) | 0.257***<br>(0.058) | 0.253***<br>(0.056) |
| N                                     | 343                 | 343                 | 343                 | 343                 | 343                 | 343                 | 343                 | 343                 | 343                 |

Note. Based on imputed sample. Standard errors in parentheses (clustered: day-care facility); hh=household.

Source. NEPS SC2 v6-0-1.

\*  $p < 0.05$ . \*\*  $p < 0.01$ . \*\*\*  $p < 0.001$ .

### 3.6.3 *Sensitivity analyses*

We ran additional analyses to demonstrate to which extent our results are sensitive to model specifications. In order to address concerns that the binary coding (daily vs. less than daily) of parental cognitive stimulation at home influenced our conclusions about the relationship between parents' socio-economic status and indicators of parental cognitive stimulation, we ran the logit models using an alternative coding (Table A6). We collapsed the response categories into two categories, distinguishing between parents who reported engaging in an activity with their child at least weekly or less than weekly. In line with the main models above, the results from these models suggested that parents' education was significantly positively related only to reading activities.

Next, we addressed concerns that the relationship between children's music activities and their math skills is driven by the common cause of parents' cultural capital. We ran the model including parents' cultural capital measured as number of books at home and parental cultural activity in order to test whether parents' cultural capital was indeed a common cause that was confounding the mediator-outcome relationship. However, parents' cultural capital was not significantly associated with children's math scores (Table A7). In addition, an analysis using the KHB method (Kohler et al., 2011) showed that parental cultural capital was not a significant confounder of the relationship between music participation and math. Including cultural capital in our mediation models may introduce bias through an overcontrol of the relationship between parents' education and

concerted cultivation. Therefore, we decided to report the main models without parental cultural capital as a covariate.

We conducted an additional analysis to address concerns that the non-significant relationship between indicators of parental cognitive stimulation and children's cognitive skills were related to the choice of dependent variables. We ran the models using children's vocabulary skills as the dependent variable (Table A8). The results showed that parents' education was not related to children's growth in German vocabulary between Wave 1 and Wave 3. Yet, we found a significant positive relationship between parent-child reading and children's vocabulary test scores. Hence, reading seems to be a parenting behavior that can increase children's vocabulary. However, the vocabulary skills were measured in Waves 1 and 3, which differed from the time points for the other dependent variables (Waves 2 and 4) used in the main analysis. We did not include these results in order to maintain comparability of the variables in the models.

Furthermore, we ran the mediation analyses with different model specifications: (1) full sample with outcome measured in Wave 2; (2) small sample (using only respondents who participated in Wave 4) with outcome measured in Wave 2; (3) small sample with outcome measured in Wave 4, without the lagged dependent variable; (4) small sample with outcome measured in Wave 4, with the lagged dependent variable (Figure A1). A comparison of the coefficients between the two models with outcomes measured in Wave 2 (black and grey markers), shows the extent to which panel attrition may have influenced the results. A comparison of the confidence intervals (large versus small sample Wave 2) indicates to what extent our results may be biased

through a lack of power in the reduced sample. Some of the associations would be significant with a larger sample (sports with math, reading with math, and reading with concentration). However, we do not know if this would still be true if a lagged dependent variable were included. Reducing the baseline heterogeneity may also lead to non-significant effects, even in a larger sample.

A comparison of the effect magnitude in the large sample compared to the small sample with outcomes measured in Wave 2 may indicate how sensitive a specific association is to selective sample attrition. It is striking that primarily the associations involving reasoning and reading are sensitive to the selective attrition, which may be driven by the reduced share of children with migration background in the small sample, as these indicators involve language capacities to some extent. The associations of music enrollment with any of the outcomes are not sensitive to selective attrition. It is, however, noteworthy that the effect magnitude jumps up in the Wave 4-models. As an explanation, we may speculate that music training shows its full benefits for children's skill development only after a certain exposure and duration of practice. To conclude, the reduction in the sample size may have led to an underestimation of the effects of our mediators, in particular for parental reading. The reported findings in the main analysis about the association between music and cognitive skills, however, are supported by our sensitivity analysis.

In addition, we estimated all mediation models using an indicator of the total hours spent engaged in organized leisure activities (Table A9). The latter did not predict growth in any of the cognitive skill measures. We checked for multicollinearity of the variables in the



final models. The variance inflation factors (VIF, calculated with *mivif*) were all around 1, which indicates that the analysis does not suffer from multicollinearity problems (Table A10).

### 3.7 DISCUSSION AND CONCLUSION

This paper contributes to our understanding of how educational inequalities widen across the transition from preschool to elementary school and how disadvantages are transmitted from parents to children in the context of the German society. In order to explain this phenomenon, we referred to Lareau's theoretical concept of concerted cultivation—a parenting strategy that focuses on the continuous fostering of children's skills through various parenting behaviors—which is prominent in families of higher social classes. For this study, we applied Lareau's concept of concerted cultivation, which arose from observations of families with school children to the context of preschool children. We proposed a theoretical extension of her concepts to suit the preschool context. We argued that concerted cultivation is likely to be visible already during early childhood and that it is likely to be reflected not just in enrollment in organized leisure activities but also in the degree of parental cognitive stimulation.

To test our hypotheses, we analyzed German panel data from children in day-care. In the first part of our analysis, we found that socio-economic status, measured as parents' education, was positively related to distinct indicators of concerted cultivation. Children from families with higher socio-economic status were more likely to be

enrolled in music and sports, a finding that is in line with previous research (Carolan, 2018; Carolan & Wasserman, 2015; Coulangeon, 2018; De Moll & Betz, 2014; Dumais, 2006). We found that only reading was significantly positively related to parents' socio-economic status, but not other forms of parental cognitive stimulation. This finding is surprising given previous research that shows a positive relationship between parental socio-economic status and home learning environment (Guo & Harris, 2000; Kluczniok & Mudiappa, 2018; Niklas & Schneider, 2017). These studies, however, used sum scores rather than single items, which may disguise that only few types of parental activities drive the observed association. Another explanation for our findings may be that - at this early age - parents with a higher socio-economic status focus on other stimulation activities that are perceived as more appropriate for this age group. In the case of Germany, where preschool is not part of the formal educational system like in the U.S., the idea of teaching children academic content already before they enter school is comparatively new (Knauf, 2019). From a theoretical perspective, our results may explain why Lareau did not report rich parental cognitive stimulation at home as a core dimension of parenting of the middle-class. Also, the finding is in line with Schaub's (2010) argument that parental cognitive stimulation may have become a normative behavior at the end of the 20th century and therefore may be independent of parents' socio-economic status (see also research by (Cano et al., 2019; Craig et al., 2014)).

In the second part of our analysis, we focused on the relationship between concerted cultivation and children's cognitive skills. The results showed that only participation in music activities at the age of

five, but not sports, was significantly positively related to children's cognitive skills at the age of seven. This finding is in line with research by Cabane et al. (2016), who used German data and explicitly focused on comparing the benefits of sports and music activities. Yet, our finding is in contrast with studies that found a positive relationship between dance or athletic activities and children's math or reading skills (Covay & Carbonaro, 2010; Dumais, 2006). Our rather broad measurement of organized sports activities may have hidden some of the positive associations between cognitive stimulation and children's cognitive skill gain. Specific sports activities may indeed contribute to cognitive skills gains. Furthermore, the children in our sample were very young, so that we believe their sports activities are more likely to trigger motoric skills rather than cognitive skills compared to sports training at later ages. Since the samples, cultural contexts, and operationalizations vary between our study and previous research, some of these differences may explain the varying results. Further research is needed on the specific mechanisms through which different activities contribute to cognitive skill gains.

Our mediation analysis showed that music participation explained a modest portion of the differences in math and reasoning skills that existed between children from different socio-economic backgrounds. Yet, the strength of the association of music participation with math skills is somewhat larger than the association reported in the meta-analysis (Cohen's  $d=0.17$ ) by Sala and Gobet (2017). Our sensitivity analyses showed that our sample does suffer from selective attrition, but that – unlike the other two predictors – especially music and its association with cognitive outcomes seems to be only marginally

affected by this attrition. Although we suggest a cautious interpretation of the results, we have reason to be confident that our analyses for music are reasonably robust. We, therefore, suggest the following explanations for the deviating results. First, experimental studies (Kaviani et al., 2014; Rauscher et al., 1997; Schellenberg, 2004) also report non-negligible effects of music training on cognitive outcomes. The experimental design of these studies neutralizes the influence of unobserved confounders, which lends certain credibility to our results. We controlled for a rich set of covariates but we cannot entirely rule out that part of the association between music and cognitive skills is driven by unobserved confounders, which may increase the magnitude of the relationship. Moreover, our study assumes exposure to music training over an extended period, whereas the typical experimental study takes place within a limited time frame. If we assume that music training does not take effect immediately, but rather after a longer period of enduring training, the effect in our analyses may not materialize before age seven. Given that our observation period is longer than in the typical experimental setting, it also may be plausible that our effects render somewhat larger than in previous research. This, however, certainly is an aspect of concerted cultivation that deserves further scrutiny and validation in the future. Parent-child reading at the age of five was not related to growth in the three sets of cognitive skills we focused on but was related to vocabulary development, as shown in the sensitivity analyses (Table A8). Overall, our findings suggest that only a small set of parenting behaviors of higher educated parents is related to actual cognitive skill gains. Yet, in particular, those activities with the clearest association with parental education were those that turned out to predict children's cognitive skill development.

This shows that highly educated parents, consciously or unconsciously, apply the parenting behaviors with the highest pay-off.

Yet, the results of this study should be interpreted with some limitations in mind. First, as with all studies based on observational data, we cannot rule out that our results are biased by unobserved heterogeneity, even though we controlled for a large set of covariates, including pretest scores on our cognitive skill measures. Second, due to the small sample sizes on which the second part of our analysis was based, our findings cannot be generalized to the German population. The analysis of attrition suggested that the sample of the mediation analysis was more privileged (fewer single-parent households and parents with migration background), which may have biased the benefits of concerted cultivation downwards. We suggest that this attrition may primarily affect outcomes and activities that involve language skills (reasoning and reading), because of the higher share of native Germans in the reduced sample. Moreover, our sensitivity analyses showed that some of the associations between our independent and dependent variables might have become significant using a larger sample. This concerns in particular the relationships of sports enrollment with math skills, of reading with math skills, and of reading with concentration skills). Yet, we cannot apply a LDV approach to the Wave 2-only-analyses and therefore it is not possible to establish whether non-significant results are driven by power issues or by baseline heterogeneities. Another limitation is that our study was restricted to observations of children enrolled in day-care facilities. However, only 4% of the 5-year-olds in Germany are not enrolled in a day-care facility, and this group consists of children from various social backgrounds. Hence, a day-

care sample should be largely representative (Schmitz & Spieß, 2018; Schober & Spieß, 2013). Fourth, we focused on only three types of cognitive skills. Therefore the data did not allow us to study the role of non-cognitive skills. For instance, organized sports participation may contribute to children's skills such as team spirit, leadership skills, adherence to rules, perseverance and frustration tolerance, which we could not assess in this study. Therefore, it is important that future studies examine a diverse set of outcome measures including cognitive and noncognitive skills. Furthermore, it may be valuable to use two types of academic outcome measures: standardized test scores and more subjective skills ratings by teachers (e.g., Coulangeon, 2018). Using merely standardized scores does not allow to capture "symbolic benefits" of concerted cultivation on academic outcomes (Mikus et al., 2020). Finally, our concerted cultivation measures were based on parents' self-reports so that we cannot rule out the possibility that the responses were influenced by social desirability or other sources of measurement error. Also, organized leisure activities were measured only with a dummy variable indicating enrollment. Unfortunately, the data neither allowed us to examine the role of the time spent in each activity nor the quality of these activities. This also applies to our measures of parental cognitive stimulation. Interestingly, however, our sensitivity analyses showed that the overall amount of time spent in organized leisure activities did not significantly explain the social gradient in growth in cognitive skills. Another limitation of the data was that we were not able to differentiate between maternal and paternal involvement. Yet, research has shown that the children's gains of the stimulation may differ between mothers and fathers (Cano et al., 2019;

Hsin & Felfe, 2014). Future data collections should, therefore, collect precise information on the involvement of each parent.

Despite these limitations, our study provides valuable insights into socio-economic background differences in parenting strategies in Germany and hence fills a gap in existing research. Our analyses showed that concerted cultivation is a phenomenon that is already visible during preschool age and also exists in the context of Germany. Growing up in a family in which at least one parent has a tertiary degree provides children with a somewhat higher level of stimulating activities inside and outside the home. Concerted cultivation was most strongly reflected in the dimension of enrollment in non-formal music activities. Although organized leisure activities are strongly subsidized in Germany, children from lower income families still tend to be enrolled in these activities less often. Hence, reducing financial barriers might not be sufficient for achieving equal levels of enrollment in organized leisure activities across social classes. On the whole, however, concerted cultivation appears to play a minor role for the intergenerational reproduction of social inequalities in the three cognitive skills domains included in our study. Our results suggest that besides organized music activities at a young age, none of the observed differences explain the skill gap in cognitive skills. Hence, it remains a puzzle how cognitive skill differences evolve and how current parenting strategies are shaping these.

# 4

## STUDY 2. PARENT-TEACHER CONTACT DURING EARLY CHILDHOOD: PARENTAL, TEACHER AND INSTITUTIONAL PREDICTORS.

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## ABSTRACT

Close contact between parents and teachers during early childhood can have several benefits for children's development. However, not all parents are in regular contact with the teacher. This article analyses to which extent parental and institutional characteristics predict the intensity of parent-teacher contact. Hypotheses are derived from sociological theories focusing on parental predictors and contrasted with theories focusing on institutional predictors of parent-teacher contact. While several studies on parent-teacher contact in the school setting exist, few quantitative studies exist with a focus on the early childcare setting. Data from the German National Educational Panel Study (NEPS) on parents with children in childcare centers is used to study a diverse set of predictors of the frequency of conversations between parents and teachers. The ordinal regression results show that in the context of German childcare centers, prominent theories on predictors of parent-teacher contact do not have the expected explanatory power. Neither the examined parental nor institutional predictors explained much variance in parent-teacher contact. While parental education showed the strongest association with parent-teacher contact, the association was opposite the expected direction—the higher the education the less likely parents had frequent contact with the teacher.

#### 4.1 INTRODUCTION

Interactions between parents and teachers represent an essential bridge between two different worlds: the home and educational institutions. This relationship's relevance is widely recognized and has been enshrined in educational policies in numerous countries (German Federal Ministry for Family Affairs, Senior Citizens, Women & Youth, n.d.; U.S. Department of Education, 2002). It is a channel through which two important socialization spheres exchange information in order to foster a child's growth and development (Bronfenbrenner, 1993; Lee & Bowen, 2006). According to Domina (2005), close connections between parents and educational institutions provide parents with social control and access to insider information. Through conversations with teachers, parents monitor their child's strengths and weaknesses, which in turn allows them to better support their child at home (Hill & Taylor, 2004; Powell, 2001).

Moreover, parents can strategically connect with teachers to signal compliance with institutional standards, influence teachers, and request changes to their children's educational experience (Lareau, 1987, 2000, 2003; Young, 2020). Close connections between educational institutions and parents can also improve teaching and care quality because teachers can gain important information about a child through conversations with his or her parents (Friederich, 2011). However, despite the several benefits of close contact between parents and educational institutions, not all parents are equally involved. Hence, the question arises as to which factors determine levels of parent-teacher contact.

Only if these are known can informed and well-targeted interventions for increasing levels of parent-teacher contact be developed.

There are two somewhat independent strands of research on predictors of parent-teacher contact; the sociological research focusing on parents' social background characteristics and the educational science literature focusing on institutional and teacher characteristics. One of the most frequently mentioned predictors of the intensity of parent-teacher contact in sociological research is parental socio-economic status (SES). Lower SES parents may report lower parent-teacher contact because they perceive school and home as separate spheres (Lareau, 2003, 2011) lack cultural resources (e.g., specific vocabulary) (Lareau, 2003; Lee & Bowen, 2006; Stormont et al., 2013) and face more financial and time constraints that limit involvement (Bennett et al., 2012; Chin & Phillips, 2004). In addition, it is frequently discussed that parents with an immigrant status have more tenuous contact with the school because they perceive cultural differences and face language barriers (Blackledge, 2001; Crozier & Davies, 2007; Turney & Kao, 2009; Wang, 2008). Educational scientists, in contrast, have emphasized the role of the educational institution and the teacher (Crozier & Davies, 2007; Epstein, 1990). For instance, institutions differ in the degree to which they provide a welcoming climate to parents, and not every teacher has enough temporal resources for parental engagement. In sum, research from sociology and educational science suggests a broad set of predictors of parent-teacher contact.

However, these predictors are rarely studied simultaneously, and it remains unclear to what extent social background effects on parent-teacher contact are confounded by institutional factors. In addition,

we also do not know to what extent these predictors translate to the context of early childhood care institutions, as most of the research on parent-teacher contact has studied parents of schoolchildren. However, context of early childhood care institutions differs in several regards from the school context (e.g., opportunity structures for parent-teacher contact, informality of interaction), meaning that the explanatory power of some predictors (e.g., parental social background) may vary between the school and childcare context.

To close this gap, I utilize a sample of 1519 parents with children in childcare centers from the German National Educational Panel Study. I estimated ordered logistic regressions to examine the following research questions:

1. What is the role of parental social background characteristics in predicting parent-teacher contact during early childhood?
2. What is the role of institutional and teacher characteristics in predicting parent-teacher contact during early childhood?

By answering these questions, I provide a valuable extension of previous research in several regards. First, I simultaneously examine parental, institutional, and teacher characteristics that may act as barriers or bridges to parent-teacher contact. Previous research has often focused on either parental predictors or institutional predictors (e.g., Barg, 2019a, 2019b; Cantin et al., 2012; Feuerstein, 2000; Kohl et al., 2000). Second, I utilize recent data from a nationally representative sample of parents with children in early childhood care centers. The majority of previous research has either focused on schoolchildren or

was based on small or selective samples of parents with children in childcare institutions (Calzada et al., 2015; Coelho et al., 2018; Rattenborg et al., 2018). The large dataset also allows me to control several covariates, such as child characteristics. Third, few studies have utilized German data (for an exception see Killus & Paseka, 2016; Sacher, n.d.), despite the fact that there are significant differences between countries regarding the context of parent-teacher contact (e.g., opportunities for parent-teacher contact, teachers' education, the influence of parents on children's school experiences).

In the following section, I summarize the existing knowledge about predictors of parent-teacher contact and parent-school contact in general. This knowledge is mainly derived from research in the primary and secondary school contexts. In section 4.3, I discuss to what extent the "known" predictors of parent-teacher contact may apply to the context of childcare centers in Germany. After describing the utilized data and method in section 4.5, I present the results in section 4.6. In the last section, I discuss the findings and provide a conclusion regarding the main research questions.

## 4.2 PREDICTING LEVELS OF PARENT-TEACHER CONTACT

### 4.2.1 *The role of parental characteristics*

Previous research suggests that parents with a higher socio-economic background have more frequent parent-teacher contact (Crosnoe, 2012; Grolnick et al., 1997; Kohl et al., 2000) and intervene more in school

matters on behalf of their child compared to working-class parents (Lareau, 2003). One of the most prominent explanations for this finding was proposed by Lareau (1987, 2000, 2002, 2003). Based on her qualitative study in the U.S., Lareau (2003) argued that different levels of parent-school contact might stem from social class-based differences in child-rearing orientations (for similar arguments, see also Hoover-Dempsey & Sandler, 1997). Whereas middle-class parents follow a “concerted cultivation” parenting logic, working-class parents follow a parenting logic known as “accomplishment of natural growth.” The main difference in these child-rearing orientations lies in parents’ understanding of their role in their children’s education. Middle-class parents feel highly responsible for their children’s education and schooling. In contrast, working-class parents see the school and home more as separate spheres and focus on providing children love and shelter, but do not apply strategies to maximize children’s skill acquisition. Lareau even observed that some middle-class parents saw teachers as employees who need to be supervised and directed. In contrast, working-class parents tried to avoid contact with the educational institution. Supporting Lareau’s argument, Crozier (1999) found that working-class parents place considerable trust in teachers to educate their children and rely on the teacher to inform them about potential problems in school.

Not only cultural child-rearing logics may explain SES differences in parent-teacher contact, cultural capital may also play a role (Lareau, 1987; Symeou, 2007). According to Bourdieu’s cultural reproduction theory, the possession of cultural capital facilitates interactions between parents and school because schools, as middle-class institutions,

represent a high-cultural capital environment (Bourdieu, 1974, 1977). Likewise, cultural capital in the form of specific resources such as familiarity with specific terminology is more prevalent in higher social classes. This means that the interactions between teachers and parents from a higher social class may be smoother and come more naturally (Lareau & Horvat, 1999). In contrast, low-SES parents may feel inferior in their conversations with teachers because they lack specific vocabulary and are intimidated by teachers' authority (Lareau, 2002). Indeed, studies have shown that a higher social status facilitated interactions between parents and teachers because more highly educated parents knew the professionals' vocabulary and felt confident intervening in school matters (Lareau, 2003; Reay, 2002).

Besides parental socio-economic status, parental race or immigrant status has been proposed as a predictor of parent-teacher contact. Although Lareau (2003) observed that child-rearing orientations are mainly independent of race, research based on large U.S. quantitative datasets suggests that race predicts concerted cultivation (Bodovski, 2010; Cheadle & Amato, 2011). In particular, it seems likely that race or ethnicity plays a role for the concerted cultivation dimension of parent-teacher contact (Lareau & Horvat, 1999). For instance, Rattenborg et al. (2018) found that American Indian parents more strongly perceive family and school as separate spheres compared to White parents and have lower rates of parent-teacher communication.

In Germany, it is more suitable to examine parents' immigrant status instead of race as a predictor of parent-teacher contact. The theoretical explanations for less parent-teacher contact among immigrant parents are partly similar to the arguments regarding parental socio-economic

status. Immigrant parents may lack some cultural resources required for parent-school contact and compliance with institutional standards (Crozier & Davies, 2007; Lareau & Horvat, 1999; Turney & Kao, 2009; Wang, 2008). The most obvious resources are language abilities, because the lack of a shared language complicates interactions (Crosnoe et al., 2016; Perreira et al., 2006; Turney & Kao, 2009). Moreover, researchers have argued that parenting differs between immigrants and the native-born, so that mutual expectations and perceptions of “the right parenting” between teachers and immigrant parents may differ (Bernhard et al., 2010; Cherng & Ho, 2017; Eccles & Harold, 1996). This can in turn lead to lower trust and less (positive) interactions (Lareau & Horvat, 1999).

However, the cultural explanations as those above are not the only potential explanations for differences in the intensity of parent-school interactions. Some researchers argue for the importance of situational constraints faced by parents with a low SES (Bennett et al., 2012; Chin & Phillips, 2004). For instance, Chin and Phillips (2004) argued that differences in parenting stem from situational constraints, such as a lack of time and financial resources, rather than differences in parenting logics. Time and financial resources are usually lower for low-SES parents (Li & Fischer, 2017). Even when high-SES parents are dual earners with few time resources, they can hire a babysitter and/or housecleaner to free up time resources. In contrast, low-SES parents often have less flexible work schedules and lack the money to hire a babysitter and pay for transportation to attend school events (Jeynes, 2011; Lareau, 2000). Not only economic resources, but also being a single parent, can constrain parent-school contact. Single parents are often less able



to flexibly change their daily routine compared to two-parent families and face time and monetary constraints (Myers & Myers, 2015). The argument that parent-school contact is mainly related to situational constraints suggests that equalizing resources would diminish the association between parental social class and parent-school contact. However, evidence concerning the relevance of situational constraints is mixed. Studies show that parental time resources do not necessarily predict parent-school contact (Barg, 2019b). However, being a single parent has been found to be related to infrequent parent-school contact (Barg, 2019a, 2019b; Crosnoe et al., 2016).

#### 4.2.2 *The role of teacher and institutional characteristics*

Regarding parent-school contact, some researchers challenge the assumption that parents are “hard-to-reach” by claiming that there are institutional characteristics that act as barriers to frequent parent-school contact (Boag-Munroe & Evangelou, 2012; Eccles & Harold, 1996; Epstein, 1990; Harris & Goodall, 2008; Hoover-Dempsey et al., 1987; Kim, 2009; Müller et al., 2015). Some researchers even argue that the institutions are hard-to-reach rather than the parents (Crozier & Davies, 2007; Harris & Goodall, 2008). For instance, a welcoming climate and outreach efforts by the institution are suggested as key factors for close parent-school contact (Feuerstein, 2000; Hoover-Dempsey & Sandler, 1997; Kerbow & Bernhardt, 1993; Walker et al., 2005; Williams, 2011). Research shows that an institution’s openness, as reflected by the number of opportunities for parents to get involved,

is more likely to stimulate high parent-teacher contact levels (Cutshaw et al., 2020; Galindo & Sheldon, 2012).

While the institution sets the interaction context and provides the opportunity structure, teachers are parents' interaction partners. Not only parents but also teachers need resources to facilitate frequent parent-teacher interactions. For instance, early childhood teachers' time and energy are essential prerequisites for parent-teacher interactions and therefore represent situational constraints (Epstein, 1990; Müller et al., 2015). Moreover, childcare teachers' mindset and knowledge about successful parental engagement strategies may influence the degree of parent-teacher interactions (Ansari & Gershoff, 2016; Epstein & Dauber, 1991; Fröhlich-Gildhoff et al., 2006; Greenwood & Hickman, 1991; Perlman & Fletcher, 2012; Swick & McKnight, 1989).

#### 4.3 PARENT-TEACHER CONTACT IN THE CONTEXT OF CHILDCARE CENTERS IN GERMANY

Before arguing why childcare centers in Germany are a valuable context to study parent-teacher contact, I provide a brief description of this context. Most childcare centers in Germany are run by the state or non-profit organizations; for-profit childcare centers and childcare centers run autonomously by parents represent only a small share (Lange et al., 2008). In Germany, parents have a right to a spot in a childcare center, and 95.6% of children between the ages of four and five attend a childcare center (Strunz, 2013). Enrollment rates at these ages only marginally differ by parental socio-economic status and

parental migration background (Schober & Spieß, 2013). Therefore, childcare centers in Germany have contact to the vast majority of parents. In most German federal states, childcare teachers are instructed to have a conference with parents at least once a year about their child's development.

Although important foundations for parent-school contact may be laid in early childhood, the majority of research on parent-teacher contact has taken place in the primary and secondary school context. Can we assume to find the same predictors of parent-school contact across different institutional contexts? Schools and early childhood institutions may both have a middle-class bias. The educational missions of both contexts are defined by the dominant class, and teachers are likely to represent middle-class parenting values. Nevertheless, crucial differences exist, making early childhood institutions an interesting context to study predictors of parent-teacher contact.

First, the opportunity structure for interactions between parents and teachers is much better in the childcare context. Usually, parents have to bring and pick up their children from the institution, as they still depend on an adult to find their way between home and the educational institution. Hence, parents meet with teachers frequently with no specific intention. In the school context, this is much different. Most interactions between parents and teachers occur on planned occasions and require active motivation by the parent to interact with the school. Previous research suggests that parents with a low SES and parents with a migration background are less likely to actively seek contact with the school institution or attend formal contact events (Barg, 2019b; Cooper, 2010).

Second, due to childcare centers' more informal nature compared to schools, differences in parent-teacher contact by parental social background may be weaker. Compared to schools, the content of the interactions between parents and teachers in childcare institutions is likely to be less academic. While the educational mission of early childhood care centers more strongly focuses on care and teaching children everyday skills, the subject matter taught in schools is much more technical and academic. For instance, while children in German childcare institutions learn how to brush their teeth and count one-digit numbers, children in elementary school learn the first abstract mathematical concepts. Hence, the expertise gap between parents and teachers may be less pronounced in the childcare setting compared to schools. Moreover, the similarity between the activities children perform at home and in the institutional context is higher for early childhood care compared to school. Parents and childcare teachers share similar experiences regarding children's activities. Therefore, differences in cultural resources between parents and teachers may be less salient, meaning that even parents with low cultural resources are less likely to feel out-of-place or incompetent in their interactions with teachers.

Third, the stakes for higher social classes may be perceived as lower in early childhood than in school. In school systems with early tracking such as Germany, important decisions about a child's education are mainly made at the end of elementary school (usually Grade 4), just before children transfer to secondary school. Hence, high-SES parents with status maintenance motives may engage in intense parent-teacher contact only at this later stage of their child's educational career, when

the course of their children's future education is about to be set and teachers serve as important gatekeepers. Accordingly, SES differences in the context of early childhood may be weaker than in the context of school or school transitions.

Fourth, the difference in educational level between less-educated parents and childcare teachers is likely to be lower compared to schoolteachers. At least in Germany, most childcare teachers have a mid-level school leaving certificate plus vocational training (Autorengruppe Fachkräftebarometer, 2017). According to Bourdieu's cultural reproduction theory and Lareau's concept of concerted cultivation, lower SES parents may therefore feel less out-of-place at early childhood care centers than schools because most childcare teachers have lower levels of education than schoolteachers.

Despite these crucial differences between schools and childcare centers, only a few studies exist that have tested the aforementioned predictors of parent-teacher contact in the context of early childhood care centers, most relying on small samples (Cantin et al., 2012; Coelho et al., 2018; Holloway et al., 2008; Miller et al., 2014; Yamamoto et al., 2006).

#### 4.4 THE PRESENT STUDY

The different theoretical explanations of parent-teacher contact and the existing empirical evidence suggest that variation in parent-teacher contact intensity stems from multiple sources (Fan et al., 2018; Hornby & Lafaele, 2011). This study focuses on parental, teacher, and institutional predictors of parent-teacher contact. Taking a more holistic

approach, I unite the sociological perspective, which primarily focuses on family-level predictors, with the educational science perspective, which more strongly focuses on the institution (e.g. Eccles & Harold, 1996). Based on the theories of parent-teacher contact described above, I derived the following hypotheses:

**Hypothesis 1:** Parental education (representing cultural resources and orientations) is positively related to parent-teacher contact.

**Hypothesis 2:** Parental immigrant status (representing cultural resources and orientations) is negatively related to parent-teacher contact.

**Hypothesis 3:** Parental situational constraints are negatively related to parent-teacher contact.

**Hypothesis 4:** The openness of the institution is positively related to parent-teacher contact.

**Hypothesis 5:** Teachers' time resources are positively related to parent-teacher contact.

**Hypothesis 6:** Teachers' knowledge about parental engagement strategies is positively related to parent-teacher contact.

In addition to simultaneously examining the explanatory power of parental and institutional characteristics, I examine whether theoretical arguments from the school context translate to the context of childcare centers. Moreover, this study is based on a German dataset and contributes to knowledge about "hard-to-reach" parents in German childcare centers. To the best of my knowledge, there is no recent representative study on parent-teacher contact in German childcare

centers. However, parental engagement guides for German early childhood care teachers describe parents with a migration background or lower education as “hard-to-reach” parents (Dusolt, 2018; Textor, n.d.) although there is little empirical evidence supporting this. The few existing studies based on parents of children in German schools (Killus & Paseka, 2016; Sacher, n.d.) even suggest that the group of “hard-to-reach parents” is more likely to consist of highly-educated rather than less-educated parents. This study will help to build more objective knowledge about barriers and bridges to parent-teacher contact in the context of German childcare centers.

#### 4.5 DATA AND ANALYTICAL APPROACH

##### 4.5.1 *Data and sample*

This study is based on the second starting cohort “Kindergarten”<sup>1</sup> of the German National Educational Panel Study (NEPS, doi:10.5157/NEPS:SC2:8.0.0; Blossfeld et al., 2011). It is a nationally representative panel study with a starting sample of 4-year-olds attending childcare center in the years 2010/2011. There is no central register of German childcare center from which a random sample of children could be drawn. Therefore, an indirect sampling strategy was used. In the first step, elementary schools were sampled on a nationwide and representative basis. These elementary schools provided a list of childcare center from which they generally receive children. In the

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<sup>1</sup> The term “Kindergarten” in the German context refers to a voluntary and non-formal education setting that aims at teaching social skills rather than academic skills.

second step, a set of childcare center for each school was randomly drawn from this list in proportion to the school's size. All 4-year-old children and their parents from the selected 279 childcare center were invited to participate in the study (Skopek et al., 2012). The data contains detailed information on the children's competence development and learning environment in the family and childcare center. Parents (mostly mothers as primary caregivers), childcare teachers, and the childcare center directors were interviewed annually, and children performed various competency tests.

Rich information about children, parents, and the institutional childcare context makes this data well-suited for an analysis of predictors of parent-teacher contact. I used information from the first wave (2011) and second wave (2012), when children were still attending the childcare center. 2996 children were interviewed in Wave 1, which corresponds to a response rate of 56.2% (Skopek et al., 2012). For my analyses, I use only cases that include a completed parent questionnaire in Wave 1 and Wave 2 (N=1,632). I also excluded children with a diagnosed disability from the analytic sample (N = 14). Missing data due to item non-response was imputed using multiple imputations with survey weights, which is currently seen as the best strategy of dealing with missing data (Graham, 2009). I used the chained equations imputation method with 20 imputations (StataCorp, 2019; command: `mi impute chained`). The largest amount of missing data occurred for institutional variables. For instance, the item indicating teacher-child ratio was missing in 19.9% of cases. For further information on the missing data, see Table B1 in the Appendix. After imputing



missing data, the final sample consisted of 1519 children enrolled in 498 groups in 225 childcare centers.

#### 4.5.2 *Analytical strategy*

Due to the ordinal scale of the dependent variable, I ran ordered logistic regression models using the `ologit` command in STATA 16 (StataCorp, 2019). The proportional odds test suggested that this assumption of the ordered logistic regression model was not violated. In order to access the institution and teacher data, the analyses were run in the NEPS remote environment. To examine to what extent the effects of parental social background factors on parent-teacher contact are confounded by institutional characteristics, I estimated the model in two steps (Model 1: parental variables, Model 2: parental and institutional variables). For all models, I used clustered standard errors to account for the fact that the children were nested in childcare facilities. I chose this approach instead of a multilevel analysis because the correlations between parent-teacher contact levels within institutions was very low (ICC= 0.05) and only a small number of parents were nested within the same institution (on average  $N=6.7$ ). Moreover, research shows that the results of multilevel estimations and regression estimations using clustered standard errors come to similar results (McNeish et al., 2017). My analyses employ the longitudinal weights for parents and their children provided by the NEPS staff (`w_tp12`). The dependent variable parent-teacher contact was measured in Wave 2, while all predictor variables were measured in Wave 1. The results are presented

as unstandardized regression coefficients (b) and Average Marginal Effects (AME).

#### 4.5.3 Variables

Table A1 provides descriptive statistics for the variables and contains information about the coding of each variable. Below, I provide additional details on the operationalizations of the key constructs and their distribution.

##### *Dependent variable*

*Parent-teacher contact.* In the second wave, when children are in their last year of childcare before entering school, parents were asked how often they have conversations with a childcare teacher about their child's behavior, development, or problems. The response categories ranged from never (1) to very often (5). Due to small cell sizes, I had to combine the categories never (1) and seldom (2). In most German federal states, childcare teachers are required to hold a conference with parents about their child at least once a year, which explains why few parents reported having never had such a conversation with a teacher. In the estimation sample, 12.73% of parents report talking with childcare teachers very often about their child, while 13% report that they seldom or never talk to the teacher. The majority of parents report talking sometimes (36.79%) or often (37.48%) with the teacher about their child.

*Predictor variables*

*Parental education.* I measured parental socio-economic background using the responding parent's education level in order to capture the non-monetary dimension of social background. I constructed a categorical variable for parental education based on the CASMIN classification, an established measure for capturing school and vocational qualifications (König et al., 1988). This variable has three levels: low education (0 = CASMIN 1 a/b/c), medium education (1 = CASMIN 2 a/b/c) and high education (2 = CASMIN 3 a/b). The low education category includes parents who never completed school, who completed compulsory schooling only (up to Grade 9 in Germany) and with basic vocational training above and beyond compulsory schooling. The medium education category includes parents with a maturity certificate or non-university-track secondary education with/without an additional vocational qualification. The high education category includes parents with tertiary education. The majority of parents in the sample fall into the medium education category (61.32%). Around 16% of the responding parents fall into the low education category, while around 22% of the parents are classified as highly educated.

*Parental immigrant status.* Responding parents were asked where they were born. I constructed a dummy with a value of 0 if the parent was born in Germany and a value of 1 if the parent was born abroad. In the analysis sample, around 18% of parents were born outside Germany.

*Situational constraints.* I used parents' reports on their net household income to capture material constraints and constructed a net equivalence household income variable using the OECD modified scale. On

average, families in the sample reported a net equivalence household income of 1550 Euro per month. Due to the right-skewed distribution, I took the logarithm of income for the analysis. To capture potential time constraints parents are facing, I used three items: parental working hours, number of siblings living in the household, and single-parent households. The parents in the sample (mostly mothers) had an average of 18 working hours per week. Working above 80 hours per week was set as an implausible value. On average, most parents reported that one sibling of the target child is currently living in their household. I categorized around 10% of the parents as living in single-parent households based on whether or not the parent was currently living with a partner (regardless of whether this partner was also the child's biological parent).

*Openness of the institution.* Early childhood care centers differ in the extent to which they welcome parents and offer diverse parental engagement forms. The childcare center directors reported if they (1) offer joint activities with parents and teachers, (2) allow parents to sit in with their children, (3) involve parents in preparing and updating the facility mission, (4) offer parent surveys and (5) have teachers complete (voluntary) home visits. On average, childcare institutions offered three types of parental involvement. The most commonly offered types of parental involvement are joint activities, parents sitting in on the facility, and parent surveys. I constructed a factor score based on a factor analysis, which showed that the three items for parents sitting in with their children, parent surveys, and home visits by teachers loaded on one common factor. I used this factor score as a proxy for the openness of the institution.

*Teachers' time resources.* To measure childcare teachers' time resources, I calculated a child-teacher ratio based on the number of childcare teachers (full-time equivalent) and the number of children per group (group size/full-time equivalent teaching staff). One teacher was responsible for twelve children on average.

*Parental engagement knowledge.* Childcare teachers reported in Wave 1 whether they had attended any specific training on parental engagement, which I utilize as proxy for parental engagement knowledge. The variable is dummy coded and has a value of 1 if the teacher has attended such training during the last twelve months. In the analysis sample, about 15% of teachers reported participating in such a training.

*Control variables.* Child characteristics are not the study's focus; however, I included them to estimate parental and institutional predictors net of child characteristics. I included a child's age, sex and antisocial behavior. The average age of the children in the sample is five years two months, and around half of the children are female. A child's developmental problems measured in terms of antisocial behavior can represent an alternative explanation for the association between parental SES and parent-teacher contact and is therefore an important control variable. Both parents and teachers may increase parent-teacher contact when a child's development deviates from the average. The responding parents and teachers in the sample answered five questions from the Strengths and Difficulties Questionnaire (SDQ), capturing the child's prosocial behavior. NEPS provides a sum score for this subscale ranging from 1 to 10; higher values represent more prosocial behavior. To capture antisocial behavior, I reversed the prosocial behavior score

so that higher values indicate more antisocial behavior. I included parents' and teachers' ratings as separate predictors into the estimation since they correlate only weakly ( $\rho = .21$ ). The average parent-rated antisocial behavior score was 2.67, which indicates that most parents do not judge their child's social behavior as unusual. The average teacher-rated antisocial behavior score was higher, at 3.95. The difference in parent and teacher ratings may be due to social desirability bias or stereotypes. In addition to these child characteristics, I included a variable indicating whether the family lives in the former East or West Germany to capture the broader historical context. Previous research suggests that childcare centers in West Germany provide slightly more opportunities for parent-school contact than childcare centers in East Germany (Viernickel, 2013). Around 84% of the responding parents were living in West Germany. 90% of the respondents were mothers. Nevertheless, I included the sex of the respondent as a control variable. Finally, I included a measure indicating whether a child attends the childcare center half-day or full-day as a control variable. Parents whose children attend the center only half-day (max. 25 hours per week) may feel less of a need for close parent-teacher contact since their children spend fewer hours outside the home.

## 4.6 RESULTS

### 4.6.1 Bivariate analysis

To provide a first answer concerning the predictors of parent-teacher contact intensity, I calculated bivariate correlations. Table 4.1 presents pairwise correlations between parent-teacher contact and the predictor variables. In contrast with Hypothesis 1, more highly educated parents reported lower rates of conversations with the teacher ( $\rho = -0.13$ ;  $p < .001$ ). Parental immigrant status did not correlate negatively with parent-teacher contact, as proposed in Hypothesis 2. Indeed, the correlation coefficient was positive and significant on the 10% level ( $\rho = -0.02$ ;  $p < .10$ ). Against Hypothesis 3, none of the variables measuring situational constraints were significantly related to parent-teacher contact. In line with Hypothesis 4, an institution's openness was positively associated with parent-teacher contact, although the correlation was only significant on the 10% level ( $\rho = 0.05$ ;  $p < .10$ ). In contrast to Hypotheses 5 and 6, a teacher's participation in parental engagement training and the child-teacher ratio were not statistically significantly related to parent-teacher contact ( $\rho = -0.04$ ;  $p = .175$  and  $\rho = 0.07$ ;  $p = .458$ , respectively). Regarding the control variables, I found that the parental rating of a child's antisocial behavior was significantly negatively related to parent-teacher contact ( $\rho = -0.07$ ;  $p < .01$ ). This association was not significant for the teacher ratings. Parents with older children and children enrolled more than half-day in the child-care center were significantly more likely to be in close contact with the teacher compared to parents with younger children and children

enrolled in only half-day childcare ( $\rho = 0,07$ ;  $p < .01$  and  $\rho = -0.03$ ;  $p < .05$ , respectively).

**Table 4.1:** Pairwise bivariate correlations of parent-teacher contact with all predictors.

| Predictors                                   | Parent-teacher contact |                     |      |
|--|------------------------|---------------------|------|
|  | Correlation            | Type of correlation | N    |
| <i>Parental variables</i>                    |                        |                     |      |
| Education level                              | -0.13***               | <i>Spearman</i>     | 1503 |
| Immigrant status                             | 0.02 <sup>+</sup>      | <i>Polychoric</i>   | 1503 |
| Equivalence household income                 | -0.09**                | <i>Spearman</i>     | 1291 |
| Single parent household                      | 0.06                   | <i>Polychoric</i>   | 1503 |
| No. siblings in household                    | 0.00                   | <i>Spearman</i>     | 1503 |
| Working hours (hrs/week)                     | 0.00                   | <i>Spearman</i>     | 1496 |
| <i>Institutional &amp; teacher variables</i> |                        |                     |      |
| Openness of institution                      | 0.05 <sup>+</sup>      | <i>Spearman</i>     | 1271 |
| Training in parental engagement              | 0.07                   | <i>Polychoric</i>   | 1431 |
| Child-teacher ratio                          | -0.04                  | <i>Spearman</i>     | 1257 |
| <i>Control variables</i>                     |                        |                     |      |
| Antisocial behavior (parent rating)          | -0.07*                 | <i>Spearman</i>     | 1477 |
| Antisocial behavior (teacher rating)         | 0.00                   | <i>Spearman</i>     | 1461 |
| Female child                                 | -0.08                  | <i>Polychoric</i>   | 1503 |
| Age of child (in months)                     | 0.09**                 | <i>Spearman</i>     | 1503 |
| Half-day childcare                           | -0.03*                 | <i>Polychoric</i>   | 1499 |
| West Germany                                 | -0.14                  | <i>Polychoric</i>   | 1503 |
| Female respondent                            | 0.02                   | <i>Polychoric</i>   | 1503 |

*Source.* Author's own calculations based on NEPS SC2 8.0.0 (un-weighted)

<sup>+</sup> $p < 0.1$ ; \* $p < 0.05$ ; \*\* $p < 0.01$ ; \*\*\* $p < 0.001$

#### 4.6.2 Multiple regression analysis

After these bivariate findings, I present the findings of the multiple regression analyses based on imputed data to examine the relationships between each predictor and the dependent variable, holding all other predictors constant. Due to the ordinal scale of the dependent variable, I ran an ordered logit model predicting the frequency with which parents have conversations with teachers (Table 4.2).



The results show that counter to Hypothesis 1, parental education was statistically significantly negatively associated with the intensity of parent-teacher contact. Highly educated parents had, on average, a nine percentage point lower probability of talking frequently with their child's teacher (AME = -0.093;  $p < .01$ ) compared to less-educated parents. Parents with a medium level of education had, on average, a six percentage point lower probability of talking frequently with their child's teacher (AME = -0.066;  $p < .05$ ) than less-educated parents. Parental immigrant status was not statistically significantly associated with the intensity of parent-teacher contact, and the coefficient was relatively small (AME = 0.008), which counters Hypothesis 2. Also, contrary to Hypothesis 3, none of the situational constraints parents may face were significantly related to the intensity of parent-teacher contact. Turning to the institutional and teacher characteristics, I found that the institution's openness was statistically significantly positively related to the intensity of parent-teacher contact, in line with Hypothesis 4. A one-unit increase in the institution's openness was related to an around seven percentage point increase in the intensity of parent-teacher contact (AME = 0.066;  $p < .05$ ). Contrary to Hypotheses 5 and 6, neither teachers' knowledge about parental engagement nor teachers' time resources mattered for the intensity of parent-teacher contact.

The control variable for the child's antisocial behavior as reported by the parent was statistically significantly negatively associated with parent-teacher contact (AME = -0.014;  $p < .05$ ). Parents attending an early childhood institution in West Germany were six percentage points less likely to report high-intensity parent-teacher contact (AME

= -0.063;  $p < .001$ ). A child's age and sex were not statistically significantly related to parent-teacher contact. Moreover, the sex of the responding parent and enrollment in half-day care were also unrelated to parent-teacher contact.

**Table 4.2:** Ordered logistic regression predicting conversations of parents and teachers.

|  | Model 1  |         |          |         | Model 2   |         |           |         |
|--|----------|---------|----------|---------|-----------|---------|-----------|---------|
|  | b        | (SE)    | AME      | (SE)    | b         | (SE)    | AME       | (SE)    |
| <i>Parental variables</i>                    |          |         |          |         |           |         |           |         |
| Medium education (CASMIN 2a/b/c)             | -0.513*  | (0.205) | -0.065*  | (0.029) | -0.519*   | (0.205) | -0.066*   | (0.029) |
| High education (CASMIN 3a/b)                 | -0.776** | (0.263) | -0.090** | (0.032) | -0.805**  | (0.261) | -0.093**  | (0.032) |
| Immigrant status                             | -0.084   | (0.208) | -0.009   | (0.022) | -0.077    | (0.205) | -0.008    | (0.022) |
| Equivalence household income                 | -0.093   | (0.172) | -0.010   | (0.019) | -0.080    | (0.168) | -0.009    | (0.018) |
| Single parent household                      | -0.065   | (0.235) | -0.007   | (0.025) | -0.068    | (0.226) | -0.007    | (0.024) |
| Working hours (hrs/week)                     | -0.001   | (0.005) | -0.000   | (0.001) | -0.001    | (0.006) | -0.000    | (0.001) |
| No. siblings in household                    | -0.003   | (0.081) | -0.000   | (0.009) | -0.003    | (0.078) | -0.000    | (0.008) |
| <i>Institutional &amp; teacher variables</i> |          |         |          |         |           |         |           |         |
| Openness of institution                      |          |         |          |         | 0.615*    | (0.273) | 0.066*    | (0.030) |
| Training in parental engagement              |          |         |          |         | 0.186     | (0.174) | 0.020     | (0.019) |
| Child-teacher ratio (group)                  |          |         |          |         | -0.018    | (0.013) | -0.002    | (0.001) |
| <i>Control variables</i>                     |          |         |          |         |           |         |           |         |
| Antisocial behavior (parent rating)          | -0.136** | (0.049) | -0.015** | (0.006) | -0.132**  | (0.050) | -0.014*   | (0.006) |
| Antisocial behavior (teacher rating)         | 0.005    | (0.033) | 0.001    | (0.004) | 0.014     | (0.034) | 0.001     | (0.004) |
| Female child                                 | -0.249   | (0.161) | -0.027   | (0.017) | -0.223    | (0.163) | -0.024    | (0.017) |
| Age of child (in months)                     | 0.016    | (0.015) | 0.002    | (0.002) | 0.021     | (0.015) | 0.002     | (0.002) |
| Half-day childcare                           | -0.141   | (0.141) | -0.015   | (0.015) | -0.114    | (0.147) | -0.012    | (0.016) |
| West Germany                                 | -0.435** | (0.150) | -0.047** | (0.016) | -0.579*** | (0.162) | -0.063*** | (0.018) |
| Female respondent                            | -0.016   | (0.261) | -0.002   | (0.028) | -0.032    | (0.262) | -0.003    | (0.028) |
| Observations                                 | 1519     |         | 1519     |         | 1519      |         | 1519      |         |

Source. Author's own calculations based on NEPS SC2 8.o.o (weighted and imputed)

\*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$

### 4.6.3 Sensitivity analyses

I am aware that regression results can be sensitive to modeling decisions. Hence, I performed several sensitivity analyses to test the robustness of the findings. I re-estimated the ordered logit model described above in a step-wise fashion, including one conceptual block of variables at a time (Table A2). The coefficients changed only marginally between models. Furthermore, I re-estimated the model using a binary dependent variable to capture the dichotomy of “hard-to-reach” and “easy-to-reach” parents. Therefore, I collapsed the parents who reported having contact with the teacher often and very often into the category “easy-to-reach” (=1) and the parents who report having contact sometimes, seldom, or never as “hard-to-reach” (=0). The overall pattern of coefficient directions remained similar. However, the AMEs were much higher in this model due to the strong contrast imposed by the binary dependent variable (Table A3).

The set of parents with an immigrant status in Germany is diverse. Therefore, I ran a sensitivity analysis using a more differentiated measure of parental immigrant status that distinguishes between parents born in Germany, Turkey, the Former Soviet Union, the rest of Europe or other countries (Table A4). The coefficients of these country-of-origin categories were much larger, and the direction of coefficients differed by country of origin. Parents born in Turkey (N=42) report being in contact with teachers more often (AME = 0.083;  $p = 0.149$ ) than German parents. The coefficient was not statistically significant on the 5% level, but may become significant in a larger sample. Parents from the Former Soviet Union (N=97), in contrast, are significantly

less likely to contact the teacher (AME = -0.051;  $p < .05$ ) compared to German parents. Hence, when looking at parental immigrant status in a more differentiated manner, we observe distinct patterns of associations, which may indicate that the intensity of parent-teacher contact is related to some underlying cultural differences between parents of different origins.

Some studies have found that middle-class parents are more likely than working-class parents to contact the teacher when children face difficulties in school (Barg, 2019a; Crozier, 1997; Horvat et al., 2016). Therefore, I tested an interaction between parental SES and children's antisocial behavior as rated by the parent. However, no statistically significant interaction between parental socio-economic status and children's antisocial behavior was found. Finally, I checked whether it makes a difference to measure parental education or working hours using information about the responding parent's partner. The results changed marginally and remain in line with the conclusions of the main analysis. All results of the sensitivity analysis that are not shown in the Appendix can be requested from the author.

#### 4.7 DISCUSSION AND CONCLUSION

This study contributes to knowledge about predictors of parent-teacher contact by studying parental, teacher, and institutional predictors of the intensity of parent-teacher contact in the context of early childhood care. I used the "Kindergarten" cohort of the German National Panel Study as a dataset, a large nationally representative sample of 4-

year-old children in German childcare centers. Based on theories and research from sociology and educational science, I derived six hypotheses about predictors of parent-teacher contact. While most previous research has focused on schoolchildren or was based on small, selective samples, I discussed and tested to what extent these findings can be replicated in German early childhood care centers using representative data.

In contrast to the majority of previous research in the school context (Crosnoe, 2012; Grolnick et al., 1997; Kohl et al., 2000; Lareau, 2003), I found that parents with a low socio-economic status cannot be considered “hard-to-reach” in terms of parent-teacher contact (Hypothesis 1). Instead, I found that parents with a higher socio-economic status report less frequent conversations with teachers on average compared to parents with a lower socio-economic status. This seems surprising in light of presented theoretical background, yet a few other studies have found the same pattern (Killus & Paseka, 2016; Mahmood, 2013; Sacher, n.d.; Sui-Chu & Willms, 1996). Unfortunately, I cannot explain this finding with the given data. However, I can tentatively propose an explanation for why parents with a higher socio-economic status may not contact the teacher frequently, while low-SES parents do. High-SES parents may feel less of a need to hold a conversation with teachers about their children because they feel very competent (Pirchio et al., 2011). Indeed, studies from the U.S. and Germany show that highly educated parents know more about child development than parents with lower education (Rowe et al., 2016). Another explanation for the negative association between parental education and parent-teacher contact could be that teachers actively seek contact with

low-SES parents. Finally, contact between high-SES parents and teachers may be less intense because they do not share the same educational background, leading to less smooth and natural interactions.

To better understand this finding, more research is needed that distinguishes who initiated the contact and the reasons for the contact. Moreover, this study only examined one specific form of parent-teacher contact: conversations between parents and teachers about a child's behavior and development. Future studies should examine other forms of parent-teacher contact. For instance, it would be interesting to see how the relationship between parental social background characteristics and parent-teacher contact change in more formal interaction settings (e.g., committees). I also did not find the expected negative association between parental immigrant status and parent-teacher contact. However, the sensitivity analysis showed that parents born in the Former Soviet Union have significantly less contact with the teacher compared to native-born Germans. Parental time and monetary constraints played a negligible role in the intensity of parent-teacher contact, which implies that equalizing these resources would not lead to equal levels of parent-teacher contact.

Regarding the role of teacher and institutional characteristics, I found that neither teachers' time resources nor teachers' training in parental engagement were significantly associated with parent-teacher contact. Only the openness of the institution was significantly positively related to parent-teacher contact intensity. This may indicate that childcare centers' opportunity structures or institutional climate trigger frequent parent-teacher contact. However, more research is needed to identify the critical institutional factors that lead to high parent-teacher contact.

Overall, the results suggest that the examined hypotheses on predictors of parent-teacher contact do not translate well from the school to the childcare setting. Neither parental nor institutional variables explained a large amount of the variation in parent-teacher contact. Therefore, future studies should add other predictors to their models, such as social network factors or parents' and teachers' beliefs about parent-teacher contact. For the German context, this study shows that existing stereotypes about "hard-to-reach" parents may not be valid for German childcare centers or that childcare teachers are already able to successfully apply measures to reach immigrant parents and parents with low education. In contrast to common knowledge, this study shows that high-SES parents rather than low-SES parents are less in contact with the teacher. Looking at the results for the control variables, it may be valuable to focus on interacting with parents whose children exhibit social developmental problems, as they seem to be more likely to be "hard-to-reach" (see also Izzo et al., 1999; Swartz & Easterbrooks, 2013). This would imply a shift in focus from social categories such as education and immigrant status to children's needs. Furthermore, the finding that parent-teacher contact in East Germany is six percentage points higher points to a deeply rooted culture of interaction between parents and teachers. This finding is surprising, since previous research found that childcare centers in West Germany provide more parental engagement opportunities (Viernickel, 2013).



# 5

## STUDY 3. CHILDREN'S CONVERSION OF CULTURAL CAPITAL INTO EDUCATIONAL SUCCESS: THE SYMBOLIC AND SKILL-GENERATING FUNCTIONS OF CULTURAL CAPITAL

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## ABSTRACT

A prominent explanation of intergenerational educational inequality is Bourdieu's cultural reproduction theory. Indeed, previous studies have frequently shown that children's cultural capital relates to academic outcomes. However, it remains unclear how children convert their cultural capital into achievement. While Bourdieu argued that cultural capital influences academic outcomes primarily by biasing teacher's grades, other researchers have proposed the alternative explanation that children's cultural capital absorption directly translates into academic skills. Using survey data on 2975 fifth graders from the German National Educational Panel Study, we disentangle these two mechanisms of children's cultural capital conversion; and argue that the main conversion mechanism depends on the cultural capital dimension examined. The results of our structural equation model suggest that both mechanisms are at work and that the main conversion mechanism depends on the dimension of cultural capital examined.

## 5.1 INTRODUCTION

One of the most prominent sociological explanations of social inequality in education is Bourdieu's cultural reproduction theory (Bourdieu, 1986; Bourdieu & Passeron, 1971). Bourdieu argues that social class differences in educational outcomes arise from parent's unequal possession of cultural capital. Middle class parents, who are assumed to be more familiar with the legitimate culture, transmit their cultural capital to their children via active socialization (e.g., taking the child to the museum) and passive role modelling (e.g., reading books). Children, in turn, convert their cultural capital into educational outcomes in the school setting. Schools, Bourdieu proposes, are 'middle-class institutions', which expect and reward cultural capital and familiarity with the legitimate culture of the dominant classes (Bourdieu, 1974).

Bourdieu's theory stimulated a great amount of research, which largely supports his argument (Bodovski et al., 2016; De Graaf, 1986; Farkas et al., 1990; Jæger, 2011; Van de Werfhorst & Hofstede, 2007). However, while many researchers have identified an association between cultural capital (e.g., reading habits, beaux-arts consumption) and educational outcomes, it remained under dispute how children convert their cultural capital into academic success (Aschaffenburg & Maas, 1997; De Graaf, 1989; DiMaggio, 1982; Jæger, 2009).

Bourdieu himself placed a strong emphasis on the symbolic value of cultural capital: cultural capital has a positive influence on academic outcomes because it symbolizes higher social class membership and leads teachers to misconceive children's cultural capital as academic

brilliance (Bourdieu, 1974; Bourdieu & Passeron, 1977). Therefore, cultural capital is arbitrary in the sense that it gains its value from its recognition by the dominant class. Cultural capital has particular relevance in the school context, as “schools are not socially neutral institutions but reflect the experiences of the ‘dominant class’” (Lamont & Lareau, 1988, p. 155). Students, who are not socialized into the preferences, attitudes, and behaviors of the middle class, hence will struggle to conform to the expectations of the educational system. Schools, according to Bourdieu and Passeron (1971), therefore appear to be meritocratic institutions, while in fact they discriminate against working-class children and conserve inequalities. A plethora of theoretical and empirical work is based on these considerations, and not all adhere to the original concept of cultural capital. Some researchers, for example, argue that cultural capital has an intrinsic value and enhances academic outcomes by directly contributing to children’s skill development (Crook, 1997a; De Graaf et al., 2000; Kingston, 2001; Sullivan, 2001). This perspective inherently assumes that skills, such as linguistic and mathematic competences, are non-arbitrary, universally accessible and therefore constitute the meritocratic legitimation of social selection. A long-standing and fruitful debate arose around the question if “real” and “symbolic” cultural capital can be distinguished (see for a recent discussion Krarup & Munk, 2015). Our contribution does make such a distinction, and we acknowledge that our approach deviates from the more orthodox reading of cultural capital theory that is prevalent in many theoretical discussions.

Empirical evidence suggests that both mechanisms are at work. Studies that show a positive association between cultural capital and objective

ability measures support the idea of the skill-generating function of cultural capital (Jæger, 2011; Jæger & Breen, 2016; Roscigno & Ainsworth-Darnell, 1999). Studies that show a positive association between cultural capital and subjective performance measures (e.g., teacher grades), controlling for objective ability measures, support the idea of the symbolic function of cultural capital (DiMaggio, 1982; Dumais, 2002; Farkas et al., 1990).

However, to examine under which conditions cultural capital has a skill-generating or symbolic function, it is necessary to pay close attention to the dimensionality of cultural capital. Researchers have argued that the main conversion mechanism of cultural capital depends on the type of cultural capital (De Graaf et al., 2000; Leopold & Shavit, 2013). Cultural capital which comprises the mere consumption of culture (e.g., visiting the theatre, classical concerts or museum) is less likely to contribute to children's skill development than productive cultural activities (e.g., reading, taking lessons in visual or performing arts). Cultural consumption nevertheless may be converted into educational advantages by its symbolic function.

Therefore, we aim to answer the following research questions:

1. Do different dimensions of cultural capital vary in the degree to which they generate skills?
2. Does the symbolic value of different dimensions of cultural capital persist once objective measures of academic skills have been taken into account?

To answer these questions, we test to which extent the two cultural capital dimensions are related to two kinds of educational outcomes that differ in their subjectivity: grades (a subjective measure of performance) and standardized ability test scores (an objective measure of academic performance). We propose that the consumption dimension is not or only weakly associated with test scores, but works via its symbolic value and is therefore associated with teacher assessments (grades, net of measured ability). The productive dimension is likely to be more strongly related to test-scores because it directly translates into the skills that are required and rewarded in school.

In the remainder of this paper, we first discuss previous literature on different conceptions of “cultural capital conversion” and develop our theoretical framework, including a set of hypotheses. To test these hypotheses, we apply structural equation modelling to data from the German National Educational Panel Study (NEPS). The NEPS provides rich longitudinal data on family background characteristics, educational processes, and competence development of fifth graders.

## 5.2 CONVERSION OF CHILDREN'S CULTURAL CAPITAL

There has been a long-standing debate about the conceptualization and measurement of cultural capital (Kingston, 2001; Lamont & Lareau, 1988). A prominent and highly abstract definition of cultural capital was proposed by Lamont and Lareau who define cultural capital as “[...] institutionalized, i.e., widely shared, high status cultural signals (attitudes, preferences, formal knowledge, behaviors, goods

and credentials) used for social and cultural exclusion, [...]” (1988: 156).

While Bourdieu’s theoretical work conveys the multidimensional and complex nature of the term “cultural capital” and its content, quantitative research usually reverts to simplified notions of cultural capital and largely focuses on cultural activities – such as reading, active and passive participation in visual and performing arts, but also possessions of books, artworks or musical instruments. As discussed by Krarup and Munk (2015), most quantitative approaches deviate from the original concept of cultural capital in a strict Bourdieusian sense. They point out that cultural capital is not an isolated property of individuals but rather gains its value through individual actions and interactions in specific contexts (‘fields’). Conventional (survey-based) measurements hence are unable to fully capture the “orthodox” interpretation of cultural capital. We acknowledge this departure from the inherently relational concept. However, despite the challenging task of a satisfying operationalization and measurement, we will focus on quantitative approaches and summarize existing literature below.

Early operationalizations (De Graaf et al., 2000; De Graaf, 1986; DiMaggio, 1982) for example use the number of books at home, reading frequency or participation in high arts (such as visiting musea, theatre, and opera). Aschaffenburg and Maas (1997) extend this view and highlight the difference between consuming high arts and taking cultural classes. In contrast to cultural consumption (e.g., visiting art museums or dance performances), they regard taking classes as a “conscious investment in high cultural forms” (p. 577). Although several researchers refer to this distinction (Eitle & Eitle, 2002; Kaufman &

Gabler, 2004; Roscigno & Ainsworth-Darnell, 1999), the results of these studies remained inconclusive. This probably is due to the fact that cultural participation is operationalized in many different ways, and because researchers used several different outcome measures. Some, for example, used educational transitions or educational attainment, such as achieving a high school or college degree or entering college, as dependent variables (De Graaf, 1989; Kaufman & Gabler, 2004). Other researchers have used grades or grade point averages during high school (Crook, 1997a; DiMaggio, 1982) or standardized test scores (Bodovski et al., 2016; Jæger, 2011). The distinction between active and passive cultural participation also has been handled in different ways: Next to the more traditional measurements, such as possession of books and artworks, reading behavior or visiting performing arts (Bodovski et al., 2016; De Graaf, 1989), some researchers have referred to cultural classes and cultural trips (Roscigno & Ainsworth-Darnell, 1999) or discussions about culture in the family context (Jæger, 2009; Jæger & Møllegaard, 2017).

Despite different operationalizations, the majority of studies found a positive association between cultural capital and various academic outcome measures (Bodovski et al., 2016; DiMaggio, 1982; Farkas et al., 1990). An exception represents the research that measured cultural capital as a two-dimensional construct: beaux-arts consumption and reading behavior. Studies applying this distinction found that reading behavior was a stronger predictor of high academic outcomes than beaux-arts consumption (Crook, 1997a; De Graaf & De Graaf, 2002; De Graaf et al., 2000; De Graaf, 1986; Sullivan, 2001). Similarly, studies distinguishing active cultural participation and cultural consumption



indicate that active cultural participation may be a stronger predictor of academic outcomes (Roscigno & Ainsworth-Darnell, 1999).

These findings raised scepticism about the mere symbolic value of cultural capital. Kingston (2001) criticised Bourdieu's idea that cultural capital is always in an important sense arbitrary. He argued that not all forms of cultural capital are entirely arbitrary; some forms of cultural capital may have an intrinsic value. For instance, reading behavior is considered as a form of cultural capital, and is at the same time of intrinsic value<sup>1</sup> because it contributes to children's reading and language skills (*skill-generating function* of cultural capital) (Barone, 2006; De Graaf & De Graaf, 2002; De Graaf et al., 2000; Evans et al., 2010; Kingston, 2001).

Some researchers nevertheless draw on Bourdieu's idea of the "symbolic" function of cultural capital in the classroom: exhibiting cultural capital in the school environment may be used as a "signal" of high social status to teachers, who reward students for showing their knowledge of the legitimate culture (DiMaggio, 1982; Farkas et al., 1990; Wildhagen, 2009). From this perspective, cultural capital is entirely arbitrary and has additional value due to its recognition and legitimization by dominant groups (*symbolic function* of cultural capital) (cf. DiMaggio, 1982; Lamont & Lareau, 1988; Weber, 1968). For instance, children and their parents display their cultural capital when interacting with teachers in school, and this behavior may influence the teachers' impression and assessment of a child. This mechanism

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<sup>1</sup> It is important to note here that Kingston (2001) interpreted Bourdieu's work in a way that was described by Goldthorpe (2007) as "domesticated." Domesticated in the sense that the concept of cultural capital is not understood in relational terms and rather separated from Bourdieu's wider theoretical framework.

hence assumes that teachers are biased towards students who adopt and display middle-class behavior. This, to a certain extent and within the limitations of purely quantitative approaches, picks up the logic of cultural capital as a relational concept, which works through the legitimization within the social field of educational systems (cf. Bourdieu, 1974).

The typical strategy to test the symbolic function of cultural capital is to regress children's grades or educational attainment on their cultural capital, controlling for competence test scores. Indeed, studies have shown that children's cultural capital is positively associated with academic performance on average, net of objective ability measures (DiMaggio, 1982; Dumais, 2002; Farkas et al., 1990).<sup>2</sup> Studies examining the skill-generating function of cultural capital regress standardized ability test scores on children's cultural capital. They have been able to demonstrate that cultural capital also is related to higher academic skills (Jæger, 2011; Jæger & Breen, 2016; Roscigno & Ainsworth-Darnell, 1999). Hence, these studies show that both conversion mechanisms are at work. However, to our knowledge, there is no study which examines the relationship between different dimensions of cultural capital and different conversion mechanisms simultaneously.

To test the relation between cultural capital dimensions and their main conversion mechanisms, it is necessary to examine how the two cultural capital dimensions are associated with academic performance measures of different degrees of subjectivity. Whereas testing the

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<sup>2</sup> Objective measures means in this context that the evaluation of the test result is less prone to reflect a subjective bias of the teacher. Nevertheless, the evaluative criteria of the ability test itself can be biased towards favoring the skills of middle-class children.

symbolic function of cultural capital requires a subjective academic performance measure that can capture teacher biases (e.g., grades); testing the skill-generating function requires an objective ability measure (e.g., standardized and anonymous tests). Hence, to examine the argument that the two cultural capital dimensions relate to academic success via two different channels, we need to test the following: If cultural capital conversion takes place via its symbolic function, beaux-arts consumption will be associated with higher teacher performance ratings net of children's objective competencies. In contrast, if reading behavior directly stimulates children's competence development, reading behavior will be associated with higher competence test scores of children (Leopold & Shavit, 2013). Competence test scores reflect a largely objective measure of children's academic ability, which is not affected by teachers' biased perceptions.

To disentangle the relationship between cultural capital dimensions and their conversion mechanisms, we test the following hypotheses:

**Hypothesis 1a** (*skill-generating function*): Children's reading behavior is positively associated with their competence test scores.

Furthermore, we argue that beaux-arts consumption involves less active learning, cognitive activation, and cultural practice and hence should contribute only little to children's skill development. We therefore propose

**Hypothesis 1b**: Children's beaux-arts consumption is not associated with their competence test scores.

School grades reflect a more subjective measure of children's academic performance than standardized ability tests. Grades, therefore, may be

affected by teachers' biased perceptions. However, grades in different subjects probably differ in the degree to which they reflect subjective bias. DiMaggio (1982), for example, proposed that math grades are less vulnerable to subjective assessment than grades in English. Classes in native or foreign languages provide more opportunities for children to display their familiarity with beaux-arts culture than math classes. Hence, German grades are particularly well-suited to examine the symbolic function of children's cultural consumption.

Although we argue that reading practice is skill-generating, this does not exclude that familiarity with literature signals cultural capital in the classroom context. Students who read may not only profit in terms of ability but also may be more eloquent and confident in the classroom. On top of the skill-generating function of reading behavior, we hence expect that

**Hypothesis 2a** (*symbolic function*): Children's reading behavior is positively associated with their school grades, even when controlling for competence test scores.

We argued above, that beaux-arts consumption is not skill-generating, but familiarity with the legitimate culture may nevertheless be beneficial in class. Theory suggests that this type of cultural capital signals middle-class membership and induces a positive bias in teachers, which would be reflected in grades, but not in actual skills. We, therefore, propose that

**Hypothesis 2b** (*symbolic function*): Children's beaux-arts consumption is positively associated with their school grades, even when controlling for competence test scores.<sup>3</sup>

### 5.3 DATA, METHOD AND OPERATIONALIZATION

#### 5.3.1 *Dataset*

The German National Educational Panel Study (NEPS) is a national multi-cohort sequence design study that started in 2010. The following analyses are based on Starting Cohort 3 of the NEPS (Blossfeld et al., 2011). The data set provides information on the academic competencies, educational processes, and family environments of children who started fifth grade in 2010 in Germany. The data set entails a representative sample of fifth graders in all educational tracks of the secondary school system in Germany.<sup>4</sup> The instruments comprised standardized competence tests for math, reading, and cognitive abilities as well as questionnaires issued to children, their main caregiver, and their teachers and principals. A stratified two-stage cluster sampling design was applied; in the first stage, schools were selected using "probability proportional to size" sampling, while in the second stage, two

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<sup>3</sup> Some interpreters of Bourdieu argue that academic ability and cultural capital cannot be separated (Lareau & Weininger, 2003). This interpretation, however, does not allow separating the skill-generating and symbolic function of cultural capital. Furthermore, as Jæger (2008) has elaborated before, in theory, children can have high academic abilities even when they show few high-status cultural signals and vice versa.

<sup>4</sup> In the Germany education system, children are separated into different educational tracks after the fourth grade. Depending on the state, the tracking decision is based on teacher recommendations or parent wishes.

complete classrooms within each school were randomly selected (for details see Aßmann et al., 2011; Steinhauer & Zinn, 2016). The first wave of the panel was conducted in 2010, and the annual follow-ups encompass rotating instruments, such that the dataset does not include yearly follow-ups for all items used in the analyses.

We used the interview data from the main caregiver and the target child from Wave 1, Wave 3, and Wave 4. Due to item rotation across waves, Wave 2 did not include any of our key measures. We excluded children attending a school for children with particular educational requirements ("Förderschule") (Wave 1, N = 587). In the first wave, 3,659 school children and their parents were interviewed, clustered in 447 classes and 228 schools. Due to panel attrition, the sample size dropped to 2,428 children and parents in Wave 4. We conducted additional analyses applying full-information maximum likelihood to test for bias due to item and wave non-response. The results did not vary qualitatively and are summarized below in the sensitivity analyses.

### 5.3.2 *Modelling strategy*

We estimated structural equation models (SEM) with latent variables using Mplus7 (Muthén & Muthén, 1998-2015). Modelling latent constructs, such as cultural capital, has the advantage of reducing measurement error. Furthermore, the SEM allowed us to simultaneously estimate how different dimensions of children's cultural capital relate

to their reading test scores and German grades and disentangle direct and indirect pathways.

Our analysis consisted of two steps. First, we assessed the appropriateness of the measurement models for our latent variables by estimating a simultaneous confirmatory factor analysis. Second, we estimated a full SEM with a direct path from children's reading behavior to reading test scores (H1a) and a direct path from children's beaux-arts consumption to their German grades, controlling for reading test scores (H2b). To test our argument convincingly that beaux-arts consumption mainly has a symbolic function, and reading behavior mainly has a skill-generating function, we also included a direct path from beaux-arts consumption to reading test scores (H1b) and a direct path from reading behavior to German grades (H2a).

To prevent spurious associations between the dimensions of children's cultural capital and academic outcomes, we included parental education, children's migration background, age, parental school-related support, readiness for exertion and fluid intelligence in the equations. Cultural reproduction theory suggests that the association between parental education and children's academic outcomes can be explained by parental and children's cultural capital as serial mediators (Jæger & Breen, 2016). Therefore, in addition to the direct path between the parental education and children's academic outcomes (German grades and test scores), we specified an indirect path via parents' and children's cultural capital representing the intergenerational transmission of cultural capital.

Parental and children's cultural capital were both measured as latent constructs with three indicator variables. Children's academic performance in German was measured as a latent construct based on two indicators. We measured our dependent variables, reading test scores and German grades, in seventh and eighth grade, respectively, to ensure the temporal precedence of our explanatory variables (children's cultural capital) measured in fifth grade. The time gap is because NEPS does not provide competence test scores for the second wave (sixth grade). To account for categorical items and non-normally distributed variables, we applied a weighted least squares mean variances (WLSMV) estimator with pairwise deletion (Muthén & Muthén, 1998-2015). We used clustered standard errors to account for children being nested within schools.

Although we use data from more than one wave, we do not model change across time. We assume that short term changes in our main explanatory variable—children's cultural capital—are unlikely to directly influence children's academic outcomes. The "cultural capital effect" mainly stems from the long-term absorption of cultural capital. Hence, our analysis does not allow for a causal interpretation. However, we include several covariates to reduce omitted variable bias and lagged our explanatory variables to strengthen our argument about the direction of causality.



### 5.3.3 *Operationalization*

Descriptive statistics for the variables can be found in the appendix (Table C1). Unless indicated otherwise, all variables were measured in Wave 1 (fifth grade).

#### *Central constructs*

*Children's academic performance* was measured with their end-of-term grade in German. In Germany, school grades are not based on standardized assessments and therefore, are likely to reflect student characteristics beyond mere academic ability (Maaz et al., 2008). As mentioned above, we chose German grades as our outcome measure because these are particularly likely to capture teacher subjectivity (DiMaggio, 1982). The data set contains grade information reported by parents and children. To ensure a time gap between our independent and dependent variables, we used grades at the end of the seventh grade, measured retrospectively in Wave 4 (eighth grade). Both, children's and parents' reports on school grades are prone to measurement error, due to memory effects and social desirability. Therefore, we used the parents' and children's responses to construct a latent factor for German performance. For ease of interpretation, we inverted grades so that higher scores imply higher performance. We collapsed the two lowest categories (5=poor, 6=inadequate) because frequencies were very low, so that the final indicators ranged from 1 = very good to 5 = poor/inadequate.

*Children's academic ability* was operationalized with weighted maximum likelihood estimates (WLEs; Warm, 1989) of standardized test scores in reading comprehension provided by NEPS in Wave 3 (seventh grade). In contrast to grades, which are assigned by teachers, these tests were designed by the NEPS team and therefore, represent a more objective measure of actual abilities. The test consisted of 33 items differing in text type (e.g., op-ed, advertisement) and task type (e.g., drawing text-related conclusions, finding information). More details about the reading ability test scores can be found in the technical reports (Gehrer et al., 2012; Pohl et al., 2012).

*Children's beaux-arts consumption* was measured with children's responses to three ordinal items on attending i) classical concerts, opera and ballet performances, ii) theatre, and iii) museums or art exhibitions during the last 12 months. The item scales ranged from 1 = never to 5 = more than 5 times. Beaux-arts consumption is a rather rare phenomenon among students of this age, meaning that these variables had right-skewed distributions. In particular, visits to classical concerts, opera or ballet performances were only reported by a minority of children (~70% reported having never attended any of these performing arts in the last 12 months).

*Children's reading behavior* was measured with two ordinal items capturing children's self-reported leisure reading behavior. These items contained information about how much time children usually spent reading outside of school on a school day and a non-school day. The item scale ranged from 1 = not at all to 5 = more than 2 hours. The most common responses to reading on a school day were 2 = reading up to half an hour, and 3 = reading between half an hour and one hour.

The most common response to reading on a non-school day was 2 = reading up to half an hour.

#### *Other covariates*

We added several covariates to our analysis to reduce omitted variable bias and to describe the cultural reproduction process more thoroughly. We included two dimensions of parental cultural capital as central mediators between parental education and children's cultural capital. We measured *parental beaux-arts* consumption with three ordinal items on parents' self-reported cultural consumption (classical concert/opera/ballet, theatre, museum/art exhibition) during the last 12 months. The item scale ranged from 1 = never to 5 = more than 5 times. As with the children, parental beaux-arts consumption was rather infrequent, giving these variables right-skewed distributions. In particular, visits to classical concerts, opera or ballet were only reported by a minority of parents (-60% reported having never attended any of these performing arts in the last 12 months). We used two metric items on parents' self-reported leisure reading behavior to measure *parental reading behavior*. These items contain information on how many hours the parent usually spends reading on a workday and a day off. On average, parents reported reading an hour per day, on workdays and likewise on days off. Values higher than 10 were considered implausible and set as missing. This was the case for a total of eight responses. To measure *parental education*, we used the highest number of years of education in the family (for a discussion of alternative specifications of parental education see Korupp et al., 2002). Each respondent's years of education were calculated by the NEPS team based on the Com-

parative Analysis of Social Mobility in Industrial Nations (CASMIN) classification. CASMIN is a certificate-oriented classification schema which combines the length of the educational experience as well as a differentiation between general and vocationally-oriented education (König et al., 1988). We chose to use parents' years of education as a quasi-metric variable because this allows for more parsimonious modelling than the original categorical measurement of CASMIN.

We included *children's idealistic academic aspirations* in the model as they represent another potential link between children's cultural capital and academic outcomes. Furthermore, we included a dummy variable for the *child's migration background* in our analysis because children with a migration background may not be native speakers of German. Therefore, they may read fewer German books and have less favourable academic outcomes in the German school system. The constructed dummy variable had the value of 1 if at least one of the child's parents was not born in Germany. Moreover, we included *children's fluid intelligence* (as a measure of reasoning and problem-solving skills) (Cattell, 1987) as a covariate because it may lead to more frequent reading and better academic outcomes. The NEPS includes two tests of children's fluid intelligence: a picture symbol test measuring perceptual speed (NEPS-BZT) and a matrices test measuring reasoning (NEPS-MAT) (Lang et al., 2014). We chose to use children's test scores on the reasoning task as our measure of fluid intelligence. Finally, we included *children's gender* and *children's age* (measured in years based on the child's birth year) as controls. Children's age and being female may positively related to their reading behavior and cultural consumption as well as academic outcomes. Furthermore, we included summary

measures of *parents' school-related support* (3 items: purchasing additional study materials, support with presentations and information search on the internet) and of *children's school-related readiness for exertion* (3 items measured in Wave 2: handling work material with care, completing tasks with great care, perseverance on difficult tasks). This was motivated by Kingston's (2001) popular critique of cultural capital theory that cultural capital effects may simply reflect differences in family investment or child personality.

## 5.4 RESULTS

### 5.4.1 *Bivariate statistics*

We began our analysis by calculating bivariate correlation coefficients (see Table 5.1). In line with our argument, children's reading behavior was positively and significantly correlated with reading competence ( $\rho = .29, p < .001$ ). Children's reading behavior was positively correlated with German grades to a similar extent ( $\rho = .22, p < .001$ ). Furthermore, we found a positive correlation between children's beaux-arts consumption and German grades ( $\rho = .19, p < .001$ ). The correlation between children's beaux-arts consumption and reading scores was only half as large ( $\rho = .08, p < .001$ ).

**Table 5.1:** Bivariate correlation coefficients for key variables.

|  | (1)          | (2)          | (3)          | (4)          | (5)          | (6) |
|--|--------------|--------------|--------------|--------------|--------------|-----|
| (1) German grade (child)                       | 1            |              |              |              |              |     |
| (2) Reading test score (child)                 | <b>0.409</b> | 1            |              |              |              |     |
| (3) Beaux-arts cultural capital (child)        | <b>0.185</b> | <b>0.080</b> | 1            |              |              |     |
| (4) Reading behavior cultural capital (child)  | <b>0.222</b> | <b>0.288</b> | <b>0.210</b> | 1            |              |     |
| (5) Beaux-arts cultural capital (parent)       | <b>0.190</b> | <b>0.255</b> | <b>0.291</b> | <b>0.155</b> | 1            |     |
| (6) Reading behavior cultural capital (parent) | 0.032        | <b>0.081</b> | 0.034        | <b>0.068</b> | <b>0.214</b> | 1   |

*Note.* Pairwise Spearman correlations. Coefficients significant on the 5% level in bold. Weighted sum indices were used for latent constructs. *Source.* Author's own calculations based on NEPS SC3 6.0.1.

#### 5.4.2 Multivariate results from structural equation modelling

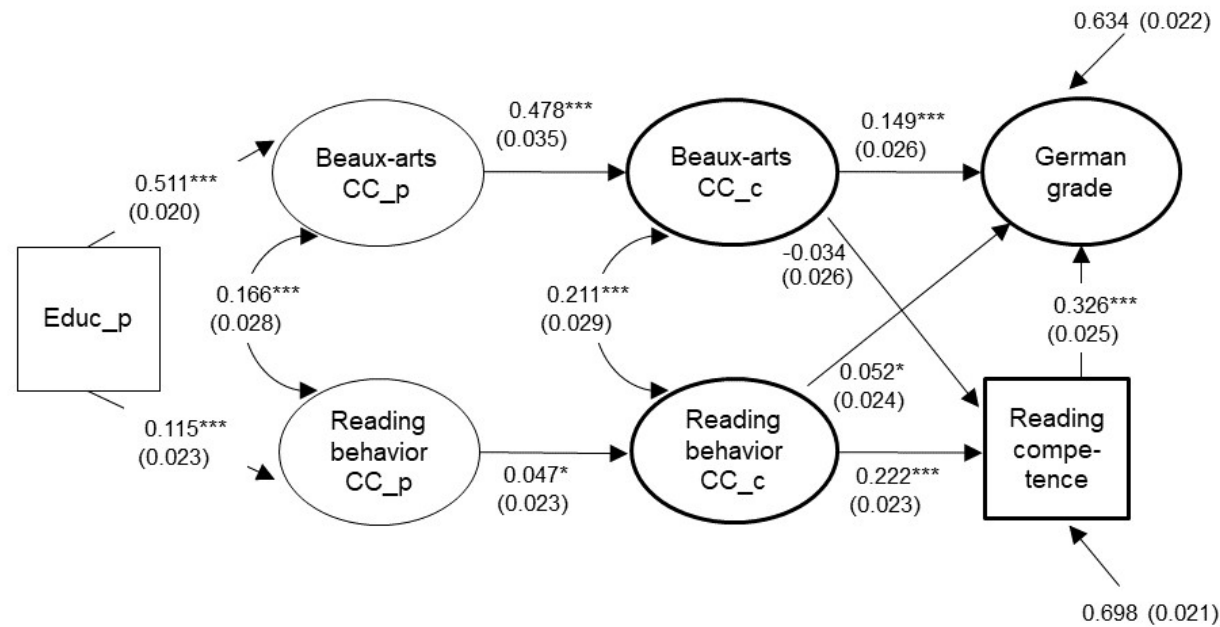
Before modelling the full SEM, we assessed the appropriateness of the measurement models for our latent variables by conducting a simultaneous confirmatory factor analysis. For reasons of identification, we constrained the factor loadings of the two items making up the latent constructs for children's and parents' reading behavior to 1. Applying commonly used cut-off criteria (Browne & Cudeck, 1992; Hu & Bentler, 1999), the measurement models had adequate fit ( $\chi^2 = 296.862$  df(45);  $p < 0.000$ , comparative fit index (CFI) = 0.985, Tucker-Lewis index (TLI) = 0.979; root mean square error of approximation (RMSEA) = .033) (see Appendix, Table C1 for more details).

We then estimated a full SEM to test our hypotheses on how the different dimensions of children's cultural capital relate to academic outcomes. The hypothesized model fit the data well,  $\chi^2 = 524.801$  df(132);  $p < 0.000$ , CFI = 0.967, TLI = 0.952, RMSEA = .032. Figure 5.1 depicts a reduced form of the standardized SEM results showing the direct effects of our central constructs (for direct effects of further covariates, see Appendix Table C2). Overall, our model explains 37%

of the variance in German performance and 30% of the variance in reading competence.

The results show that, on average, more highly-educated parents possess a higher level of cultural capital with respect to beaux-arts consumption as well as frequency of reading ( $\beta_{\text{beaux-arts}} = .511$ ,  $SE = 0.020$ ,  $p < .001$ ;  $\beta_{\text{reading}} = .115$ ,  $SE = 0.023$ ,  $p < .001$ ). Furthermore, parents transmit some of their cultural capital to their children. This can be seen by the large and positive association between parents' and children's beaux-arts consumption ( $\beta_{\text{beaux-arts}} = .478$ ,  $SE = 0.035$ ,  $p < .001$ ) and by the association between parents' and children's reading frequencies ( $\beta_{\text{reading}} = .047$ ,  $SE = 0.023$ ,  $p < .05$ ), although this is smaller than for beaux-arts consumption.

In line with Hypothesis 1a (skill-generating function of reading behavior), children's reading behavior is positively related to children's reading competence. An increase of one standard deviation in reading frequency is associated with an increase by just over one fifth of a standard deviation in reading competence ( $SE = 0.023$ ,  $p < .001$ ). Moreover, children's beaux-arts consumption is positively related to their German grade even after controlling for reading scores, which is in line with Hypothesis 2a (symbolic function of beaux-arts consumption). An increase of one standard deviation in beaux-arts consumption is associated with an increase by about 15% of a standard deviation in a child's German grade ( $SE = 0.026$ ,  $p < .001$ ). The size of this coefficient is remarkable in comparison to the association between reading test scores and German grades ( $\beta = .326$ ,  $SE = 0.025$ ,  $p < .001$ ).



**Figure 5.1:** Path diagram and parameter estimates of the structural equation model with additional paths from reading behavior (child) to German grade and beaux-arts consumption (child) to reading competence.

*Note.* Standardized coefficients (STDYX) are given, with standard errors in parentheses. Some paths (e.g., path from parental education to child's academic outcomes) and additional covariates (child's gender, age, migration background, fluid intelligence, readiness for exertion, idealistic aspirations, parental school-related support) are omitted from the figure to facilitate readability. CC\_p = parental cultural capital, CC\_c = children's cultural capital, Educ\_p = parental education. Model-fit:  $\chi^2 = 524.801$   $df(132)$ ;  $p < 0.000$ , CFI = 0.967, TLI = 0.952; RMSEA = .032. N = 2975. \* $p < .05$ , \*\*  $p < .01$ , \*\*\* $p < .001$ .



The coefficient of children's reading behavior on German grades is significant but small ( $\beta = .052$ ,  $SE = 0.024$ ,  $p < .05$ ), which confirms Hypothesis 1b (symbolic function of reading behavior). Children's beaux-arts consumption is not significantly associated with reading competence ( $\beta = -.034$ ,  $SE = 0.026$ ,  $p > .1$ ), which is in line with Hypothesis 2b (no skill-generating function of beaux-arts consumption). In sum, the results suggest that children convert their cultural capital into better academic outcomes via symbolic as well as skill-generating functions and that the main conversion mechanism depends on the dimension of cultural capital.

Our analysis also provides information about the extent to which parents' and children's cultural capital mediates the relationship between parental education and children's academic outcomes, which is the core idea of cultural reproduction theory (see Appendix, Table A3). The SEM results show that parental education remains significantly positively associated with German grades and test scores ( $\beta = .123$ ,  $SE = 0.021$ ,  $p < .001$ ;  $\beta = .128$ ,  $SE = 0.019$ ,  $p < .001$ , respectively), indicating that cultural capital is only a partial mediator of these relationships. Furthermore, the SEM analysis allows us to reveal the strength of the mediation by calculating indirect effects: The standardized indirect effect of parental education on German grades via parents' and children's beaux-arts consumption is small but significant ( $\beta = .036$ ,  $SE = 0.007$ ,  $p < .001$ ). In contrast, the indirect effect of parental education on test scores via parents' and children's reading behavior is small and not significant on the 5 percent-level ( $\beta = .008$ ,  $SE = 0.006$ ,  $p > .05$ ). The opposite is true for the indirect effect of parental education on academic outcomes via children's cultural capital only.

The indirect effects via children's beaux-arts consumption on grades and test scores are insignificant, while the indirect effects via children's reading behavior on grades and test scores are small but significant. Hence, only some of the cultural capital pathways partially explain the relationship between parental education and children's academic outcomes.

Among the control variables (see Appendix, Table C2), the child's gender is influential, with girls having better reading test scores and German grades than boys on average. In addition, children with a high degree of readiness for exertion have better grades and test scores. Furthermore, we find a significant positive association between children's idealistic academic aspirations and their reading scores, but not with their grades. The child's migration background is not significantly associated with reading scores, but weakly negatively associated with German grades. Children's age is not significantly associated with German grades but negatively associated with reading competence. This small negative coefficient of age on reading competence may seem surprising. However, given that all children are in the same grade, the older students in the sample are likely to be those with low competencies who therefore repeated a grade or started school later than average. Children with higher fluid intelligence have higher reading competencies on average. However, fluid intelligence is not significantly associated with German grades, controlling for reading competence. Parental support is not significantly related to German grades, but weakly negatively related to reading scores. An explanation for this negative relationship may be that parents support children with weak academic performance more strongly.

### 5.4.3 Sensitivity analyses

To test whether the results might have been biased due to non-random wave and item non-response, we re-estimated the model using a maximum likelihood parameter estimator with standard errors that are robust to the non-normality of continuous variables (MLR). This estimator has the advantage of working well with survey weights and handles missing data with full information maximum likelihood (FIML). To adjust for the complex sampling design, we used design weights to estimate our model. The conclusions based on the sensitivity analysis resemble those drawn in our main analysis.

In addition, we re-estimated the presented model using math grades and math competence scores as outcome measures (see Appendix, Figure C1). The coefficient of children's beaux-arts consumption on math grades in this model is much smaller than in the model with German grades and not significant. This finding suggests that math grades are more objective and less prone to reflect biases. Children's reading behavior is significantly positively associated with math competencies, suggesting that reading comprehension is also beneficial in math – or that reading stimulates skills, such as logical reasoning and abstract thinking, which can be helpful to grasp mathematical concepts. Surprisingly, the association between reading and math grade is negative, which suggests that reading behavior provokes a 'negative teacher bias'. This finding gives room for speculation and our best guess at this point is that passionate readers may profit from their reading practice in terms of skill development, but still perceive math as 'unloved duty', leading to low levels of classroom participation

which is sanctioned by teachers with lower grades. Note, however, that the coefficient is very small ( $\beta = -.056$ ), so that it remains debatable if this is a meaningful finding. These results underline the importance of distinguishing between different cultural capital dimensions also for math achievement.

## 5.5 DISCUSSION AND CONCLUSION

The aim of our paper was to shed more light on how children's cultural capital is converted into academic success. Previous studies have proposed two explanations for the association between children's cultural capital and academic success: First, children's cultural capital may lead to better academic outcomes because it biases teachers' subjective performance evaluations upwards. Second, children's cultural capital may directly contribute to children's skill development and hence results in better academic achievement. Studies on the relationship between cultural capital and academic success have often neglected the fact that the two dimensions of cultural capital may imply different conversion mechanisms. While the beaux-arts dimension of cultural capital is likely to influence subjective teacher judgements, the reading behavior dimension is more likely to influence academic competencies directly. We contribute to existing research by disentangling two conversion mechanisms (skill-generating and symbolic) and by linking these to two different dimensions (active and consumptive) of children's cultural capital.

The results of our structural equation model suggest that both conversion mechanisms – the skill-generating mechanism and the symbolic mechanism – take place and that the dominant conversion mechanism depends on the dimension of cultural capital. Similar to previous research (Jæger, 2011; Jæger & Breen, 2016) and in line with our hypothesis, we found a positive association between children’s reading behavior and academic competencies (H1a). Furthermore, children’s reading behavior was also weakly but significantly related to grades (H1b). In line with previous studies (DiMaggio, 1982; Dumais, 2002), we also found a positive association between children’s beaux-arts consumption and German grades. Our analyses show that this association remains strong and significant even when reading competence is accounted for. This supports our claim that beaux-arts consumption does not generate skills to the same extent as reading does, but works via its “symbolic” function in the school context (H2b). As hypothesized, children’s beaux-arts consumption was not related to test scores (H2a). Hence, beaux-arts has mainly a symbolic function, while reading behavior has a skill-generating and symbolic function.

Our results highlight the need for future research on the association between cultural capital and academic outcomes. Our results suggest that it is important to pay close attention to the different dimensions of cultural capital and the utilized academic outcome measure. Conflicting conclusions on the symbolic versus skill-generating mechanisms in previous research may be partly due to different operationalizations and measurements of cultural capital. For instance, Evans et al.’s (2010) conclusion that cultural capital has no symbolic function might have been different if they had operationalized cultural capital as

beaux-arts consumption rather than possession of books. Furthermore, researchers interested in examining the symbolic function of cultural capital should use a subjective measure instead of, or in addition to, a standardized test score measure to avoid underestimating the symbolic function. A non-significant association between beaux-arts consumption and academic test scores does not disprove the existence of a symbolic function of cultural capital, because a symbolic function is best tested by examining the association with grades, net of actual skills.

From a policy perspective, our results suggest that the social gradient in German grades can be mitigated by two factors. First, supporting reading pleasure among students from low socio-economic backgrounds may improve their reading ability and narrow the achievement gap. Second, increasing the objectivity of teachers' grading procedures in German schools may weaken the German grade differences between low and high SES students by reducing cultural capital bias. However, due to the cross-sectional nature of the analysis, our findings cannot be interpreted as causal and need to be considered with some caution. Another limitation of our study is that we did not directly observe the proposed conversion mechanisms, but derived conclusions about their plausibility by varying the dependent variable. An alternative explanation of the positive association between children's beaux-arts cultural capital and German grades is that beaux-arts consumption teaches children about particular content, which pays off during German class in school. However, research by Sullivan (2001) shows that participation in formal culture does not lead to an increase in cultural knowledge. Nevertheless, future research should

investigate children's conversion of cultural capital more directly by examining more detailed information on student-teacher interactions and teachers' judgement processes. This would also provide valuable information on the facets of children's cultural capital that are most relevant nowadays. Due to data limitations, we applied a rather "classical" operationalization of cultural capital and measured the two cultural capital dimensions with only a few items. Our operationalization, therefore, may be limited in capturing children's cultural capital, as it exists today. Future data collections should seek to measure children's skill-generation and symbolic cultural capital dimensions with a broader array of items that better reflects contemporary cultural capital (e.g., children's use of digital media, Paino & Renzulli, 2013).

Despite the limitations, our study makes an important contribution to the understanding of educational reproduction by unpacking the black box of children's cultural capital conversion. While two theoretical arguments about the underlying conversion mechanisms have been discussed in the literature, our study is one of the first that tested both arguments thoroughly against each other and clarified under which conditions each mechanism is more likely to be at work. Our results suggest that cultural capital as a whole has neither a purely symbolic nor a purely functional value. Children who are more familiar with the legitimate culture and actively pursue activities in both dimensions of cultural capital have a double advantage: their cultural capital positively influences their actual competencies as well as teachers' evaluations of their performance. Our results highlight the role of cultural capital as a "relational" concept rather than a purely "individual" attribute of students. It nevertheless seems worthwhile to

further examine in which way teachers, for example, represent the preferences and expectations of the middle-class, giving a non-meritocratic constituent to interactions within the school context. Hence, the core idea of the cultural reproduction theory, that children who are more familiar with the legitimate culture profit from it in the school context remains highly valuable for the understanding of educational reproduction.



# 6

## GENERAL DISCUSSION AND OUTLOOK

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### 6.1 SUMMARY AND DISCUSSION OF MAJOR FINDINGS

On the most general level, this thesis contributes to the knowledge of the evolution of primary effects, the social gradient in academic performance. More precisely, this thesis contributes to the understanding of how cultural capital and concerted cultivation explain differences in children's academic outcomes by parental socio-economic background. To set the scene, I first established the theoretical and empirical background about the transmission of cultural capital and its conversion into children's educational advantages. I summarized this knowledge within an integrated theoretical framework that describes the process of cultural reproduction underpinned by the notion of concerted cultivation. This framework suggests that cultural reproduction has three key actors (parents, children, and teachers) and can be differentiated into two broader processes: transmission and conversion of cultural capital. These processes can take place in an active and passive form. Previous conceptualizations of the cultural reproduction theory have often neglected this complexity of the cultural reproduction process (except e.g., Jæger & Breen, 2016).

Based on the developed framework, three empirical studies on cultural reproduction were conducted that aimed at answering the two overarching research questions:

1. How do parents transmit their cultural capital to their children and activate their cultural capital to secure educational advantages for their children (in the context of early childhood)? [Study 1 and Study 2]
2. How is children's cultural capital converted into high educational performance (in the context of school)? [Study 3]

In the first study, the transmission of cultural capital from parents to children during early childhood by means of concerted cultivation was examined. The NEPS Starting Cohort 2 longitudinal data was utilized, which contains rich data on parents and their children attending childcare. While most previous research on concerted cultivation studied parents with school children, this study tested the argument that concerted cultivation is likely to begin already before children enter school. Accordingly, it was tested if parents' socio-economic background is related to 5-year-olds' enrollment in organized leisure activities and parents' cognitive stimulation at home—two potential indicators of concerted cultivation during early childhood. In line with previous research (Carolan & Wasserman, 2015; De Moll & Betz, 2014; Dumais, 2006) and Lareau's concept of concerted cultivation, the logistic regression analyses showed that parental socio-economic status is related to children's enrollment in organized sports and music activities. Surprisingly, the expected positive association between parental socio-economic status and all forms of parental cognitive stimulation

at home was not found. Only parent-child reading was statistically significantly positively related to parental socio-economic status. Hence, parenting differences in the sense of concerted cultivation during early childhood were only visible in children's organized leisure activities and parent-child reading.

The study also examined if these differences in parenting represent a mechanism that partially explains the association between parental socio-economic status and children's cognitive skills. While previous research has shown that cognitive stimulation at home partially explains the social gradient in children's cognitive skills development (Anders et al., 2012; Duncan et al., 1994; Kluczniok & Mudiappa, 2018; Niklas & Schneider, 2017), little is known about the role of organized leisure activities at this young age. Instead of following the popular approach of using summary measures of organized leisure activities and cognitive stimulation at home (Dumais, 2006; Guo & Harris, 2000; Kluczniok & Mudiappa, 2018), this study analyzed single items. Summary measures may disguise the role of single parenting behaviors for children's development. The lagged dependent variable regression showed that only children's participation in organized music activities was significantly positively related to children's math, reasoning, and concentration skills. This finding is in line with prior research comparing cognitive benefits of music and sports (Cabane et al., 2016). Furthermore, the mediation analysis showed that only children's participation in organized music activities explained a modest portion of the socio-economic status skill gap in reasoning and math skills. In sum, this study suggests that some but not all parenting strategies

of parents with a high socio-economic status lead to their children's cognitive skill growth and thereby reproduce educational inequality.

In the second study, the focus was shifted to the concerted cultivation dimension of parent-teacher contact. Parent-teacher contact represents one potential mechanism through which parents try to convert their cultural capital into their children's educational advantages. While parent-teacher contact was often studied in the context of school, this study investigated it in the context of early childhood, using the NEPS Starting Cohort 2 "Kindergarten." Furthermore, research about predictors of parent-teacher contact in the context of German childcare centers is rare. Consequently, current practitioners' guidelines about parent-teacher contact in Germany lack an empirical base and are at risk to distribute wrong stereotypes about the group of "hard-to-reach" parents (e.g., parents with low education or immigration background). The results of the ordinal regression analysis suggested that parents with a higher socio-economic status were significantly less likely to have frequent conversations with childcare teachers. This finding is in contrast to common stereotypes and the majority of previous research in the school context (Barg, 2019b; Crosnoe, 2012; Grolnick et al., 1997; Lareau, 2003). However, a few other studies have reported a similar pattern (Killus & Paseka, 2016; Mahmood, 2013; Sacher, n.d.). Furthermore, the results suggest that immigrant parents, on average, did not report lower levels of parent-teacher contact, which is in contrast to previous research (Crozier & Davies, 2007; Rattenborg et al., 2018; Turney & Kao, 2009). Counter to expectations, parents' situational constraints such as long working hours were not related to parent-teacher contact intensity. This may be related to the comparatively good

opportunity structures for parent-teacher contact during the pick-up and drop off routine at the childcare center.

Lastly, the study tested the argument that parent-teacher contact is not only influenced by the parents' characteristics but also by institutional and teacher characteristics. Previous research has rarely tested these groups of predictors simultaneously, so that their relative importance remains unknown. Considering institutional and teacher predictors, I found that only institutional openness was significantly positively related to parent-teacher contact. Teachers' time resources and knowledge about parental engagement, in contrast, did not predict parent-teacher contact. Overall, neither parental nor institutional, nor teacher characteristics explained a large amount of variance in parent-teacher contact.

In the third study, the focus shifted to the context of school to study how children's own cultural capital is converted into educational advantages. Therefore, data from the NEPS Starting Cohort 3, which contains data of parents and their children in fifth grade, was used. In the ongoing discussion about the mechanisms of cultural capital conversion, previous researchers have often neglected to pay close attention to the chosen measure of academic performance (objective versus subjective measures) and the dimensionality of cultural capital measures. Study 3 closed this gap by a) utilizing two academic performance measures that differ in the degree of objectivity (grades and test scores) and b) examining whether the primary conversion mechanism of cultural capital depends on the dimension of cultural capital. In line with the hypotheses, the results of the structural equation model showed that children's reading was associated with children's stan-

standardized reading scores. Reading was only weakly associated with a teacher's subjective performance evaluation (here: German grades). In contrast, children's beaux-arts consumption was only related to a teacher's subjective performance evaluation of the student but not to children's standardized reading scores. In sum, this study suggests that children's cultural capital is converted into higher academic outcomes through both mechanisms. Yet, which mechanisms can be observed depends on which cultural capital dimension is operationalized. This finding contrasts with the studies that argue against the symbolic function of cultural capital (Breinholt & Jaeger, 2020; Evans et al., 2010). However, these earlier studies neglected the crucial interplay of the operationalization of cultural capital and academic performance, which was shown in this study.

The study also tested the entire causal chain of cultural reproduction theory, that parents transmit cultural capital to their children, and children then convert it into higher educational outcomes. Most previous research so far has examined only segments of the cultural reproduction process. The serial mediation via parents' and children's beaux-arts consumption was significant but small. In contrast, the serial mediation of parents' and children's reading behavior was insignificant. Hence, the entire process of cultural reproduction (transmission and conversion) was only partially supported by the data.

## 6.2 THEORETICAL IMPLICATIONS

The cultural reproduction theory is one of the most utilized theories by sociologists for explaining the social gradient in children's school success. However, surprisingly few researchers have theorized about the two black boxes of cultural capital transmission and conversion (for an exception see e.g., Jæger & Breen, 2016). The theoretical framework presented in this dissertation thesis (section 2.3) enhances the theoretical understanding of cultural capital transmission and conversion by underpinning Bourdieu's cultural reproduction theory with Lareau's concept of "concerted cultivation." Furthermore, the framework integrates and summarizes theoretical rationales of how passive and active cultural capital transmission is taking place. Moreover, I have refined the process of children's cultural capital conversion into a passive and active conversion mechanism using Lareau's concept of "sense of entitlement." Finally, I have highlighted the role of parents in the conversion process of cultural capital, building on Lareau's observations of parent-teacher interaction. In sum, the developed framework expresses that cultural reproduction is complex and works through multiple pathways. This complexity of the cultural reproduction process was often unrecognized by prior research.

Study 1 advanced the theoretical knowledge about the black box that lies between parents' and children's cultural capital by investigating the role of concerted cultivation as a form of cultural capital transmission. Most previous research on Lareau's idea on parenting logics took place in the Anglo-Saxon school context. To address this limitation, we tested to which extent her concept of concerted cultivation can be

generalized to the context of early childhood in Germany. Therefore, we proposed a theoretical extension of concerted cultivation to better suit the early childhood context. Inspired by the parental involvement literature, we argued that concerted cultivation at an early age is likely to be visible in children's organized leisure activities but also in parental cognitive stimulation at home. However, the empirical results showed that only parent-child reading was significantly more common in families with a higher socio-economic status. Hence, the proposed conceptual extension of concerted cultivation by the indicator of parental cognitive stimulation was mostly rejected. Nevertheless, the positive associations between parental socio-economic status and children's enrollment in organized leisure activities and parent-child reading suggest that concerted cultivation is already visible during early childhood. Regarding the value of the concept of concerted cultivation for explaining the social gradient in children's cognitive skills, the results of Study 1 suggest that concerted cultivation in the form of children's organized leisure activities and parental cognitive stimulation at home played only a minor role. This finding is surprising given the rich literature showing the importance of home-learning environment for explaining social inequality in children's skills (Duncan et al., 1994; Guo & Harris, 2000; Kluczniok & Mudiappa, 2018; Pensiero, 2011). One explanation of the conflicting results may be that this study used single items instead of summary measures. The study findings furthermore suggest that, against Lareau's considerations, specific parenting behaviors rather than a whole set of behaviors contribute to children's skill differences (for a similar argument see Pensiero, 2011). In sum, the studied dimensions of concerted cultivation seem insufficient to explain the socio-economic gradient in young children's



cognitive skills and may need revision to be more suitable for the context of early childhood.

The second study further examined the generalizability of concerted cultivation to the context of early childhood in Germany. In contrast to Study 1, however, Study 2 examined the concerted cultivation dimension of parent-teacher contact. Against the idea of concerted cultivation, a positive association between parental socio-economic status and parent-teacher contact was not found. Indeed, the results suggested that there is a significant negative association. Hence, in the context of German childcare centers, middle-class parents' enactment and conversion of cultural capital into their children's educational advantages seem to be reflected in other forms than parent-teacher contact. Moreover, this result hints at important boundary conditions of Lareau's theoretical ideas of concerted cultivation. We may not find the expected social gradient in parent-teacher contact because the early childhood setting is a less culturally laden context (in Bourdieu's terms "field") than schools. Finally, Study 2 made a valuable contribution by combining two theoretical strands on predictors of parent-teacher contact, the sociological strand emphasizing parental predictors and the educational science strand emphasizing institutional and teacher predictors. However, few of the hypothesized predictors were related to parent-teacher contact, and the few significantly related paths explained only a small amount of the variation in parent-teacher contact. This finding implies that theoretical explanations need to shift away from structural explanations to more person- or process-oriented explanations (e.g., interaction quality between parents and teachers), and more theorizing is needed in general.

Study 3 refined the theoretical understanding of the black box between children's cultural capital and children's educational outcomes (cultural capital conversion). First, the study showed that cultural capital is converted into academic success via two distinct mechanisms: the skill-generating and the symbolic mechanism (via the teacher). Second, the findings suggest that the major conversion mechanism of cultural capital into academic outcomes depends on the type of cultural capital. While measures of passive beaux-arts consumption are likely lead to a symbolic benefit for academic outcomes, measures of active cultural consumption such as reading rather fulfill a skill-generating function. Hence, Study 3 qualified the process of children's cultural capital conversion in a crucial regard. Furthermore, the theoretical refinement of Study 3—both mechanisms exist depending on the type of cultural capital—offers an opportunity for reconciliation of two opposing research camps disputing about the existence of a “symbolic” versus “skill-generating” cultural capital effect.

### 6.3 LIMITATIONS

As with every piece of scientific work, this thesis has some limitations. In the following, I will summarize the central limitations of my work from an overarching perspective and will address the pivotal limitations of the three empirical studies.

First, the theoretical framework (section 2.3) represents a static model of transmission and conversion. Jæger and Breen (2016), however, showed that cultural capital transmission and conversion also has a dy-

dynamic component; inputs and outputs within the cultural reproduction process influence each other. Furthermore, the proposed framework does not display potential reversed causality, for instance, between teacher input and a child's academic ability; teachers may invest more in children who display higher academic abilities (Jæger & Breen, 2016).

Regarding the limitations of the empirical work, it is important to note that I had to restrict my analysis to some of the displayed pathways of the theoretical framework in the scope of this dissertation thesis. For instance, I could not observe to which extent teacher inputs or children's enactment of their cultural capital in the classroom related to socio-economic status differences in academic performance with the given data. From a methodological point of view, it represents a limitation that all studies were based on observational data and therefore did not allow any causal claims. Although we used panel data and controlled for confounders, the results may suffer from unobserved heterogeneity bias.

Turning to pivotal weaknesses of each study, a limitation of Study 1 was that we only studied how concerted cultivation is related to cognitive skills, yet, according to Lareau, it also is related to noncognitive skills. Therefore, we may have underestimated the relevance of "concerted cultivation" for the transmission of cultural capital in general. Regarding the dependent variable of Study 2, a weakness was that no measure of highly formal parent-teacher contact was available. Therefore, it remains an open question if the absence of the positive association between parent-teacher contact would be observed in more formal and potentially more culturally laden interactions. There are

also limitations that apply to both studies on concerted cultivation. For Study 1 and 2, we deliberately chose to study single dimensions of concerted cultivation to assess their independent contribution to children's educational advantages. However, this represents not only a strength but also a limitation. It did not allow us to examine the transmission power of concerted cultivation on the whole, and therefore we may have underestimated its role in cultural capital transmission. Moreover, the data did not allow us to measure parental child-rearing beliefs but only parental behaviors. Hence, we had to rely on the assumption that parental education is a proxy of parents' parenting beliefs and that the observed behaviors derived from these beliefs. In addition, the two studies tested the generalizability of Lareau's concept of concerted cultivation to the context of Germany and the context of early childhood. While this is a valuable contribution, it also represents a limitation because it means that two contexts were changed at the same time. Hence, any deviation in the results between our studies and Lareau's study can be related to either the change of the cultural or institutional context.

A central limitation of Study 3 was that the measure of cultural capital was relatively narrow. We relied on the popular cultural capital measures of "beaux-arts" and "scholarly culture" and were not able to measure cultural capital in the form of clothing, speech, or potential new forms of cultural capital (e.g., IT knowledge, cultural omnivorousness). Therefore, some cultural capital "effects" may have remained uncovered in this endeavor. Moreover, to test the symbolic function of cultural capital, we had to rely on an indirect test strategy instead of testing biased evaluations more directly through an experimental re-

search design. This may have lead to an estimation bias of the symbolic function. However, due to the rich battery of potential confounders in our models, this bias should be moderate.

#### 6.4 FUTURE RESEARCH IMPLICATIONS

The above mentioned limitations directly channel into implications for future research, which I will summarize in the following. I will provide implications about how research about cultural capital should occur and in which areas it is most needed.

Future research needs to pay close attention to the operationalization of cultural capital. Choosing blindly the standard approach of measuring cultural capital may restrict the value of further cultural capital research. The results of Study 3 emphasized that it is crucial to recognize the multidimensional nature of cultural capital. Moreover, researchers have to pay close attention to new evolving forms of cultural capital. For instance, Paino and Renzulli (2013) introduced the “digital” dimension of cultural capital and showed that third-graders’ computer proficiency influenced teachers’ evaluations of their academic performance.

In addition, it may be worthwhile to pay more attention to the cultural capital characteristic of “scarcity.” The measures of cultural capital in this study were not based on the argument of scarcity. However, regarding the symbolic value of specific cultural capital dimensions, this represents an essential characteristic. Also, it suggests that the symbolic benefit of a specific cultural capital declines once it is be-

coming more mainstream. For instance, if reading to a child becomes a standard behavior across social classes, it will still contribute to children's skill-generation, but it may not deliver any symbolic value anymore. Rare forms of cultural capital, in turn, should have powerful symbolic benefits for educational outcomes. The analysis of longitudinal data of different student cohorts could provide interesting answers regarding this issue. As societies keep changing, so may change their institutionalized "cultural signals."

Besides improving our understanding of how cultural capital is transmitted and converted, we also need to better understand under which boundary conditions this happens. For instance, Study 2 showed that parent-school contact was not positively related to parental socio-economic status. However, we might have seen a positive coefficient if we would have observed parent-teacher contact during a specific stage in a child's educational career, where close contact between parents and school can lead to significant educational advantages. For instance, in the context of the German education system, it would be interesting to study if the association of parent-school contact and parental socio-economic status reverses at the end of fourth grades when an important decision about the secondary education track is made. For theories and hypotheses in general, it seems crucial to include the boundary conditions.

Overall, the literature review in this dissertation thesis shows that little research exists on the role of the child herself and the teacher in the process of cultural reproduction. Yet, the teacher plays a crucial role in Bourdieu's cultural reproduction theory. To better understand how children and teachers actively contribute to the reproduction

of educational inequalities, future studies should not only rely on questionnaire data but apply qualitative methods, video recordings, or experimental designs (e.g., vignette studies) in order to document these processes in a more direct fashion.

Finally, a fruitful avenue for future research could be to examine more deeply how resources and preferences interact with each other and how this interaction relates to actual behavior. For instance, it would be interesting to study if parents with strong preferences in the manner of concerted cultivation manage to cultivate children's cultural capital, although they possess few resources for it. Understanding how preferences and resources interact would provide fundamental knowledge for the development of interventions that aim at influencing parental behavior.

## 6.5 POLICY AND PRACTICE IMPLICATIONS

On the most general level, I see two broader implications for reducing educational inequalities related to an unequal distribution of cultural capital. One approach would be that the state extends its influence on children's socialization experiences (the generation of embodied cultural capital). The other approach would be to redesign the education system so that it is not rewarding and amplifying cultural capital differences. In other words, we can either try to influence the transmission of cultural capital or its conversion.

The first paper on the concerted cultivation dimension of organization of daily life has shown that children's learning environments inside

or outside the home differs by family socio-economic status. Even if not all of these differences were related to children's cognitive skill development, it is possible that these influence children's educational success by influencing other vital skills (e.g., noncognitive skills) or through their symbolic value. To provide children from families with a low socio-economic status a stimulating environment outside the home, one policy implication of our findings would be to implement measures that increase these children's attendance in organized leisure activities. Another approach would be to improve children's socialization conditions at home by providing parents the toolkit of how they can build cultural capital within their children even when they do not possess much themselves, for instance, through shared book reading (Barone et al., 2020). As Study 2 indicates, parents with low socio-economic status are, on average, in close contact with the childcare teacher. Hence, an essential bridge between educational professionals and parents is already built and can be further exploited to support or nudge parents.

As Study 3 concludes, children from families with a high socio-economic status are more likely to possess higher amounts of cultural capital. Because of the skill-generating and symbolic value of cultural capital, these children enter the education system with a double advantage. Nash (1990) has suggested that a "universal pedagogy" that takes nothing for granted can reduce the association between children's cultural capital and academic outcomes. Hence, the education system would need to be changed to reduce academic performance differences due to cultural capital. In the context of the German education system, a move towards standardized evaluations of student performance in-



stead of the use of subjective teacher grades would weaken the cultural capital bias in students' performance (the symbolic effect). However, standardized testing is a double-edged sword, and its effect on reducing educational inequality is questionable (Tieben, 2009). While it would eliminate biased teacher evaluations, it is not likely to remove actual performance differences between socio-economic status groups in the long run. Families with a higher socio-economic status will have the resources to help their children learn the competencies assessed on standardized tests, such as through test prep, and continue to be better able to grow their children's academic skills (Park et al., 2010; Zwier et al., 2020).

## 6.6 CONCLUDING THOUGHTS AND OUTLOOK

The overarching goal of this thesis was to examine the effectiveness of the concept of cultural capital for explaining how educational advantages are transmitted from one generation to the next. Through my empirical research, reading, and writing about cultural capital as an explanation of primary effects, I became aware of some fundamental problems and weaknesses of current approaches. I will close this thesis with a plea on how to address these problems and generate further valuable knowledge regarding cultural capital and educational inequalities in general.

*Dissecting the concept of cultural capital*

Cultural capital, on its whole, is a concept that is an agglomeration of interwoven characteristics. This is particularly problematic for quantitative researchers as they usually have to specify causal orders of these agglomerated characteristics. I do not suggest abandoning the notion of cultural capital, but we may need to further “domesticate” cultural capital by underpinning it with a more precise terminology (see Kingston 2001, for a similar plea). This would make the concept more falsifiable and accessible. Not only do the processes involved in the cultural reproduction theory need to be spelled out clearly with all their assumptions, but we also need a shared and clear-cut set of vocabulary when we describe these processes.

To improve clarity, I suggest that cultural capital researchers should pay more attention to the differentiation of 1) cognition (preferences, beliefs, values), 2) behaviors, and 3) resources (e.g., skills) when talking about cultural capital (for a similar argument see Yaish & Katz-Gerro, 2012). This differentiation is crucial because these categories of constructs causally depend on each other. Behaviors may arise from a specific cognition given the necessary resources are available to perform the behavior (Jæger & Breen, 2016).

Moreover, as foreshadowed above, I suggest that we further distinguish between the functional and symbolic utility of cultural capital by dissecting cultural capital in educational capital and symbolic capital (see also Crook, 1997a; De Graaf et al., 2000). Educational capital such as cognitive and noncognitive resources, educational objects, knowledge, and a particular behavioral repertoire have a functional

utility for educational success as they represent universal prerequisites for successful academic development.<sup>1</sup> Symbolic capital, in contrast, entails all cognitions, behaviors, and resources that only gain value in the educational system through their scarcity and recognition by the dominant class. Only these represent symbolic capital, and their value is arbitrary and depends on the field (e.g., clothing style, way of speech). Accordingly, educational capital channels into higher academic outcomes through a skill-generating mechanism. Symbolic capital channels into higher academic outcomes through a symbolic and indirect mechanism.

#### *Learning from other disciplines*

As the three empirical studies have shown, cultural capital and concerted cultivation are valuable constructs to explain educational inequality. However, they are far from sufficient. In line with (Hasselhorn et al., 2015), I suggest that we apply more interdisciplinary models and begin sorting out the relative importance of proposed pathways. First, today's economists have developed their understanding of human capital which now includes not only cognitive but also noncognitive skills (Heckman & Rubinstein, 2001). Furthermore, they acknowledge that differences in human capital are not merely due to natural circumstances, luck, or tastes (Cunha & Heckman, 2007). Accordingly, economic research on differences in human capital directly informs sociological efforts of understanding primary effects. Second, psychology and educational sciences have a great understanding of how academic

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<sup>1</sup> Educational capital, therefore, includes human capital in the form of cognitive and noncognitive resources.

performance is determined. However, much of this literature has not examined socio-economic status differences in these determinants. The examination of socio-economic status differences as key determinants of academic performance is therefore a fruitful avenue for future research on educational inequality. It can improve our understanding of the evolution of primary effects and may help to explain how some individuals thrive in formal education despite their family background (= the predictors of educational success that are less socio-economic status dependent). Finally, the emerging field of epigenetics shows how children's experiences during development can shape children's gene expressions (Bueno, 2019; Landecker & Panofsky, 2013). Genes, in turn, affect personality and cognitive skills (Bouchard, 2016; Bueno, 2019). This hints at another relevant transmission mechanisms of educational advantages.

Given the wide-ranging consequences of inequalities in academic performance over the life course for every child, it is of undeniable relevance to identify the pathways of inter-generational transmission of educational advantages. To solve this puzzle, it is vital that the scientific community brings together the available interdisciplinary knowledge (and builds new knowledge) to provide policymakers the crucial information needed to develop well-targeted and informed policies to break the circle of inter-generational transmission of educational advantage.

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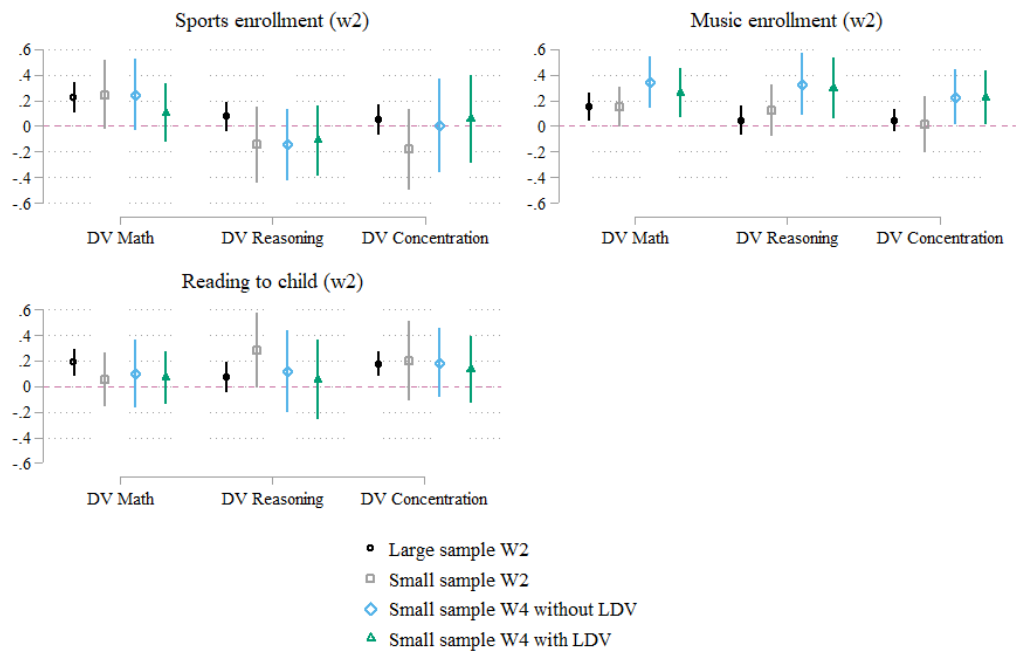


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# APPENDICES

## APPENDIX A



**Figure A1:** Regression coefficient plot of full models including all three mediators (with 95% confidence interval).

*Note.* Each subgraph shows how the coefficients of the mediators for each dependent variable differ by choice of the analysis sample or the inclusion of a lagged dependent variable (LDV).

**Table A1:** Descriptive statistics of variables (Sample of Wave 1 and 2).

|                                       | Mean% | SD    | Min.  | Max   | N    | No. Missing | % Missing |
|---------------------------------------|-------|-------|-------|-------|------|-------------|-----------|
| <i>Organized leisure activities:</i>  |       |       |       |       |      |             |           |
| Sports                                | 74    | 0.60  | 0.00  | 1.00  | 1625 | 7           | 0.40      |
| Music                                 | 35    | 0.63  | 0.00  | 1.00  | 1624 | 8           | 0.50      |
| Other                                 | 32    | 0.61  | 0.00  | 1.00  | 1624 | 8           | 0.50      |
| <i>Cognitive stimulation at home:</i> |       |       |       |       |      |             |           |
| Reading to child (daily)              | 73    | 0.59  | 0.00  | 1.00  | 1632 | 0           | 0.00      |
| Number activities (daily)             | 41    | 0.66  | 0.00  | 1.00  | 1628 | 4           | 0.20      |
| Letter activities (daily)             | 40    | 0.65  | 0.00  | 1.00  | 1629 | 3           | 0.20      |
| Teaching songs (daily)                | 11    | 0.47  | 0.00  | 1.00  | 1630 | 2           | 0.10      |
| Painting (daily)                      | 30    | 0.63  | 0.00  | 1.00  | 1632 | 0           | 0.00      |
| <i>Socio-demographic variables:</i>   |       |       |       |       |      |             |           |
| Tertiary educ. degree (family)        | 34    | 0.63  | 0.00  | 1.00  | 1632 | 0           | 0.00      |
| HH equiv. income (log, in 1,000)      | 0.34  | 0.63  | -2.10 | 2.15  | 1407 | 225         | 13.80     |
| Migration background                  | 26    | 0.61  | 0.00  | 1.00  | 1632 | 0           | 0.00      |
| West Germany (yes = 1)                | 83    | 0.47  | 0.00  | 1.00  | 1632 | 0           | 0.00      |
| Mother's working hours                | 19.51 | 22.01 | 0.00  | 80.00 | 1615 | 17          | 1.00      |
| No. siblings in hh                    | 1.10  | 1.21  | 0.00  | 8.00  | 1632 | 0           | 0.00      |
| Single parent hh (yes = 1)            | 10    | 0.40  | 0.00  | 1.00  | 1632 | 0           | 0.00      |
| Girl (yes = 1)                        | 50    | 0.67  | 0.00  | 1.00  | 1632 | 0           | 0.00      |
| Child's age (months)                  | 62.43 | 5.83  | 50.00 | 77.00 | 1632 | 0           | 0.00      |
| Child's health                        | 4.60  | 0.81  | 1.00  | 5.00  | 1632 | 0           | 0.00      |

*Note.* Estimates based on weighted observed data. hh=household; SD=standard deviation.

*Source.* NEPS SC2 v6-0-1.

**Table A2:** Descriptive statistics of variables (Sample of Wave 1, 2, and 4).

|                                       | Mean% | SD    | Min.  | Max   | N   | No. Missing | % Missing |
|---------------------------------------|-------|-------|-------|-------|-----|-------------|-----------|
| <i>Dependent variables</i>            |       |       |       |       |     |             |           |
| Math skills (w2)                      | 0.47  | 0.97  | -2.60 | 4.72  | 343 | 0           | 0.00      |
| Reasoning skills (w2)                 | 5.79  | 2.22  | 3.00  | 10.00 | 342 | 1           | 0.30      |
| Concentration skills (w2)             | 3.37  | 0.93  | 1.00  | 5.00  | 342 | 1           | 0.30      |
| Math skills (w4)                      | 2.52  | 1.17  | -0.40 | 6.57  | 334 | 9           | 2.60      |
| Reasoning skills (w4)                 | 7.00  | 2.04  | 3.00  | 10.00 | 329 | 14          | 4.10      |
| Concentration skills (w4)             | 3.38  | 1.20  | 1.00  | 5.00  | 341 | 2           | 0.60      |
| <i>Organized leisure activities:</i>  |       |       |       |       |     |             |           |
| Sports                                | 83    | 0.38  | 0.00  | 1.00  | 341 | 2           | 0.60      |
| Music                                 | 37    | 0.48  | 0.00  | 1.00  | 341 | 2           | 0.60      |
| Other                                 | 33    | 0.47  | 0.00  | 1.00  | 341 | 2           | 0.60      |
| <i>Cognitive stimulation at home:</i> |       |       |       |       |     |             |           |
| Reading to child (daily)              | 78    | 0.42  | 0.00  | 1.00  | 343 | 0           | 0.00      |
| Number activities (daily)             | 43    | 0.50  | 0.00  | 1.00  | 342 | 1           | 0.30      |
| Letter activities (daily)             | 41    | 0.49  | 0.00  | 1.00  | 342 | 1           | 0.30      |
| Teaching songs (daily)                | 8     | 0.27  | 0.00  | 1.00  | 343 | 1           | 0.30      |
| Painting (daily)                      | 27    | 0.44  | 0.00  | 1.00  | 343 | 0           | 0.00      |
| <i>Socio-demographic variables:</i>   |       |       |       |       |     |             |           |
| Tertiary educ. degree (family)        | 39    | 0.49  | 0.00  | 1.00  | 343 | 0           | 0.00      |
| HH equiv. income (log, in 1,000)      | 0.41  | 0.40  | -0.87 | 1.73  | 300 | 43          | 12.50     |
| Migration background                  | 13    | 0.33  | 0.00  | 1.00  | 343 | 0           | 0.00      |
| West Germany (yes = 1)                | 81    | 0.39  | 0.00  | 1.00  | 343 | 0           | 0.00      |
| Mother's working hours                | 19.43 | 14.74 | 0.00  | 65.00 | 340 | 3           | 0.90      |
| No. siblings in hh                    | 1.00  | 0.89  | 0.00  | 7.00  | 343 | 0           | 0.00      |
| Single parent hh (yes = 1)            | 5     | 0.22  | 0.00  | 1.00  | 343 | 0           | 0.00      |
| Girl (yes=1)                          | 48    | 0.50  | 0.00  | 1.00  | 343 | 0           | 0.00      |
| Child's age (months)                  | 62.63 | 4.09  | 53.00 | 77.00 | 343 | 0           | 0.00      |
| Educational activities (preschool)    | 29.85 | 5.23  | 12.00 | 40.00 | 325 | 18          | 5.20      |
| Child's health                        | 4.63  | 0.56  | 2.00  | 5.00  | 343 | 0           | 0.00      |

*Note.* Estimates based on observed data. hh=household; SD=Standard deviation.

*Source.* NEPS SC2 v6-o-1.

**Table A3:** Means of cognitive skill measures (Wave 4) by parental education, organized leisure activity enrollment and daily cognitive stimulating activities.

|                                       | Math   |        |                 | Reasoning |        |                 | Concentration |        |                 |
|---------------------------------------|--------|--------|-----------------|-----------|--------|-----------------|---------------|--------|-----------------|
|                                       | yes    | no     | mean difference | yes       | no     | mean difference | yes           | no     | mean difference |
| Tertiary education (family)           | 0.381  | -0.246 | 0.627***        | 0.237     | -0.147 | 0.384***        | 0.164         | -0.105 | 0.269**         |
| <i>Organized leisure activities:</i>  |        |        |                 |           |        |                 |               |        |                 |
| Music                                 | 0.336  | -0.186 | 0.522***        | 0.297     | -0.163 | 0.460***        | 0.268         | -0.146 | 0.414***        |
| Sports                                | 0.096  | -0.437 | 0.533***        | 0.027     | -0.120 | 0.147           | 0.050         | -0.202 | 0.252*          |
| Other                                 | 0.110  | -0.048 | 0.158           | 0.009     | -0.002 | 0.011           | 0.155         | -0.065 | 0.220*          |
| <i>Cognitive stimulation at home:</i> |        |        |                 |           |        |                 |               |        |                 |
| Reading                               | 0.090  | -0.311 | 0.401***        | 0.077     | -0.264 | 0.341**         | 0.070         | -0.241 | 0.311**         |
| Number activities                     | -0.018 | 0.016  | -0.034          | 0.000     | 0.010  | -0.010          | -0.042        | 0.037  | -0.079          |
| Letter activities                     | -0.034 | 0.027  | -0.061          | -0.051    | 0.030  | -0.081          | -0.082        | 0.066  | -0.148          |
| Teaching songs                        | -0.221 | 0.023  | -0.244          | -0.137    | 0.011  | -0.148          | 0.083         | -0.009 | 0.092           |
| Painting                              | -0.227 | 0.082  | -0.309          | -0.045    | 0.016  | -0.061          | -0.045        | 0.016  | -0.061          |

*Note.* Significance based on t-test. Estimates based on observed data.

*Source.* NEPS SC2 v6-o-1.

\* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$ .

**Table A4:** Effect decomposition of parental education on cognitive skill measures (using Stata command khb).

|                                    | Effect decomposition<br>(parental SES ->math<br>score) | % of total effect<br>(indirect effect/total<br>effect*100) | Effect decomposition<br>(parental SES ->reasoning<br>score) | % of total effect<br>(indirect effect/total<br>effect*100) |
|------------------------------------|--|--|---|--|
| Model without music (total effect) | .319   | **   | .264  | *  |
| Model with music                   | .282   | **   | .220  | *  |
| Indirect effect via music          | .037   | †  | .044  | †  |
|                                    |  | 11.6   |   | 16.6   |

*Note.* Based on imputed data. N= 343.

*Source.* NEPS SC2 v6-0-1.

†  $p < .1$ . \*  $p < 0.05$ . \*\*  $p < 0.01$ . \*\*\*  $p < 0.001$ .

**Table A5:** Logit coefficients of logistic regression predicting response in Wave 3.

|   | Response (w3)      | SE      |
|---|--------------------|---------|
| <i>Cognitive skill measures:</i>        |                    |         |
| Math (w2, std, WLE)                     | 0.200*             | (0.082) |
| Cognitive abilities (w2, std)           | 0.043              | (0.071) |
| Concentration (w2, std)                 | 0.105              | (0.076) |
| <i>Organized leisure activities:</i>    |                    |         |
| Sport (w2)                              | 0.308 <sup>†</sup> | (0.178) |
| Music (w2)                              | 0.197              | (0.149) |
| Other (w2)                              | 0.023              | (0.149) |
| <i>Cognitive stimulation at home:</i>   |                    |         |
| Number activities (w2)                  | 0.149              | (0.161) |
| Letter activities (w2)                  | -0.070             | (0.166) |
| Reading to child (w2)                   | 0.117              | (0.169) |
| Poem activities (w2)                    | -0.088             | (0.246) |
| Painting (w2)                           | 0.069              | (0.160) |
| <i>Socio-demographic variables:</i>     |                    |         |
| Tertiary educ. degree (family, yes=1)   | -0.245             | (0.169) |
| Migration background                    | -0.917***          | (0.195) |
| HH income (log, in 1000)                | -0.078             | (0.186) |
| West-Germany (yes=1)                    | -0.037             | (0.182) |
| Mothers' working hours (h/week)         | -0.001             | (0.005) |
| No. siblings in hh                      | -0.050             | (0.082) |
| Single parent hh (yes=1)                | -0.741**           | (0.265) |
| Girl                                    | -0.101             | (0.146) |
| Child's age (month)                     | 0.012              | (0.016) |
| Educational activities (sum, preschool) | -0.033**           | (0.012) |
| Child's health                          | 0.121              | (0.116) |
| N                                       | 1242               |         |

*Note.* Estimates based on observed data. Standard errors (SE) in parentheses; hh=household. *Source.* NEPS SC2 v6-0-1.

<sup>†</sup> $p < .1$ . \* $p < 0.05$ . \*\* $p < 0.01$ . \*\*\* $p < 0.001$



**Table A6:** Average marginal effects of family background predicting weekly (vs. monthly) stimulating activities at home (logistic regression, weighted data)

|  | Reading            | Number activities | Letter activities | Teaching songs      | Painting          |
|--|--------------------|-------------------|-------------------|---------------------|-------------------|
| Tertiary educ. degree<br>(family, yes=1) | 0.055*<br>(0.022)  | -0.001<br>(0.018) | -0.035<br>(0.024) | 0.026<br>(0.042)    | -0.036<br>(0.033) |
| <i>Control variables (family):</i>       |                    |                   |                   |                     |                   |
| HH income (log, in 1000)                 | 0.023**<br>(0.008) | 0.032<br>(0.021)  | 0.016<br>(0.028)  | 0.002<br>(0.048)    | 0.008<br>(0.034)  |
| Migration background (yes=1)             | -0.008<br>(0.016)  | 0.012<br>(0.017)  | 0.010<br>(0.031)  | 0.132***<br>(0.036) | -0.027<br>(0.027) |
| West-Germany (yes=1)                     | 0.005<br>(0.011)   | -0.017<br>(0.020) | 0.008<br>(0.026)  | 0.073<br>(0.042)    | 0.030<br>(0.028)  |
| Maternal working hours (p, h/week)       | 0.000<br>(0.000)   | -0.000<br>(0.001) | 0.000<br>(0.001)  | 0.001<br>(0.001)    | 0.001<br>(0.001)  |
| No. siblings in hh                       | 0.002<br>(0.005)   | -0.006<br>(0.006) | -0.004<br>(0.009) | 0.004<br>(0.017)    | 0.001<br>(0.016)  |
| Single parent hh (yes=1)                 | -0.016<br>(0.015)  | 0.042<br>(0.025)  | 0.051<br>(0.032)  | -0.007<br>(0.055)   | -0.032<br>(0.041) |
| <i>Control variables (child):</i>        |                    |                   |                   |                     |                   |
| Girl                                     | 0.005<br>(0.010)   | -0.000<br>(0.013) | 0.043*<br>(0.020) | 0.051<br>(0.033)    | 0.052*<br>(0.025) |
| Child's age (month)                      | -0.001<br>(0.001)  | -0.000<br>(0.002) | 0.001<br>(0.002)  | 0.005<br>(0.003)    | -0.002<br>(0.003) |
| Child's health                           | -0.008<br>(0.009)  | -0.008<br>(0.013) | 0.006<br>(0.014)  | 0.009<br>(0.027)    | 0.004<br>(0.019)  |
| N  | 1632               | 1632              | 1632              | 1632                | 1632              |

Note. Estimates based on weighted data. Standard errors in parentheses; hh=household.

Source. NEPS SC2 v6-0-1.

\* $p < 0.05$ . \*\* $p < 0.01$ . \*\*\* $p < 0.001$ .

**Table A7:** LDV regression of children's math score (w<sub>4</sub>, std) on organized leisure (OA) and parental cultural capital

|   | Math (m <sub>1</sub> ) | SE      |
|---|------------------------|---------|
| Tertiary degree (fam)                   | 0.275**                | (0.103) |
| <i>Parental cultural capital:</i>       |                        |         |
| Books at home                           | 0.060                  | (0.040) |
| Cultural activities (parent)            | -0.087                 | (0.068) |
| <i>Meditators:</i>                      |                        |         |
| Sports (w <sub>2</sub> )                | 0.071                  | (0.117) |
| Music (w <sub>2</sub> )                 | 0.260*                 | (0.100) |
| Reading to child (w <sub>2</sub> )      | 0.050                  | (0.109) |
| <i>Control variables (family):</i>      |                        |         |
| HH income (log, in 1000)                | 0.198                  | (0.115) |
| Migration background                    | 0.182                  | (0.114) |
| West-Germany (yes=1)                    | 0.046                  | (0.134) |
| Mothers' working hours (h/week)         | -0.003                 | (0.003) |
| No. siblings in hh                      | -0.085                 | (0.050) |
| Single parent hh (yes=1)                | 0.026                  | (0.175) |
| <i>Control variables (child):</i>       |                        |         |
| Girl                                    | -0.078                 | (0.089) |
| Child's age (month)                     | -0.016                 | (0.011) |
| Educational activities (sum, preschool) | 0.013                  | (0.010) |
| Child's health                          | 0.006                  | (0.078) |
| <i>Lagged dependent variable:</i>       |                        |         |
| Math (w <sub>2</sub> , std, WLE)        | 0.511***               | (0.049) |
| N                                       | 343                    |         |

*Note.* Based on imputed sample. Standard errors (SE) in parentheses (clustered: day-care facility); hh=household.

*Source.* NEPS SC2 v6-0-1. \*  $p < 0.05$ . \*\*  $p < 0.01$ . \*\*\*  $p < 0.001$ .

**Table A8:** LDV regression of children's vocabulary skills (w3, std) on organized leisure (OA) and parent-child reading

|  | Vocabulary (m1)     | Vocabulary (m2)     | Vocabulary (m3)     |
|--|---------------------|---------------------|---------------------|
| Tertiary educ. degree<br>(family, yes=1) | 0.170*<br>(0.086)   | 0.136<br>(0.095)    | 0.062<br>(0.093)    |
| <i>Mediators:</i>                        |                     |                     |                     |
| Sport (w2)                               |                     |                     | -0.151<br>(0.119)   |
| Music (w2)                               |                     |                     | 0.190<br>(0.101)    |
| Reading to child (w2)                    |                     |                     | 0.407**<br>(0.147)  |
| <i>Control variables (family):</i>       |                     |                     |                     |
| HH income (log, in 1000)                 |                     | 0.230<br>(0.123)    | 0.206<br>(0.123)    |
| Migration background                     | 0.141<br>(0.149)    | 0.156<br>(0.146)    | 0.170<br>(0.150)    |
| West-Germany (yes=1)                     | -0.141<br>(0.109)   | -0.185<br>(0.115)   | -0.218<br>(0.120)   |
| Mothers' working hours (h/week)          |                     | -0.002<br>(0.003)   | 0.000<br>(0.003)    |
| Cultural activities (parent)             |                     |                     |                     |
| No. siblings in hh                       |                     | -0.047<br>(0.053)   | -0.036<br>(0.048)   |
| Single parent hh (yes=1)                 |                     | 0.018<br>(0.236)    | 0.080<br>(0.213)    |
| <i>Control variables (child):</i>        |                     |                     |                     |
| Girl                                     | 0.104<br>(0.084)    | 0.105<br>(0.084)    | 0.104<br>(0.085)    |
| Child's age (month)                      | -0.001<br>(0.011)   | -0.001<br>(0.011)   | 0.001<br>(0.011)    |
| Educational activities (sum, preschool)  |                     | 0.010<br>(0.008)    | 0.008<br>(0.008)    |
| Child's health                           |                     | -0.139<br>(0.078)   | -0.147<br>(0.078)   |
| <i>Lagged dependent variable:</i>        |                     |                     |                     |
| Vocabulary (w1, std)                     | 0.652***<br>(0.052) | 0.622***<br>(0.055) | 0.593***<br>(0.058) |
| N  | 343                 | 343                 | 343                 |

*Note.* Based on imputed sample. Standard errors in parentheses (clustered: day-care facility); hh=household.

*Source.* SC2 v6-0-1.

\* $p < 0.05$ . \*\* $p < 0.01$ . \*\*\* $p < 0.001$ .

**Table A9:** LDV regression of children's cognitive skills ( $w_4$ , std) on concerted cultivation (OA measured with time spent in OA)

|   | Math (m1)           | Math (m2)           | Reasoning (m3)      | Reasoning (m4)      | Concentr. (m5)      | Concentr. (m6)      |
|---|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|
| Tertiary educ. degree (family, yes=1)   | 0.347***<br>(0.100) | 0.332**<br>(0.102)  | 0.269*<br>(0.103)   | 0.251*<br>(0.107)   | 0.020<br>(0.117)    | -0.015<br>(0.124)   |
| <i>Mediators:</i>                       |                     |                     |                     |                     |                     |                     |
| OA hours ( $w_2$ )                      |                     | -0.009<br>(0.019)   |                     | 0.003<br>(0.021)    |                     | 0.009<br>(0.026)    |
| Reading to child ( $w_2$ )              |                     | 0.132<br>(0.104)    |                     | 0.097<br>(0.156)    |                     | 0.172<br>(0.134)    |
| <i>Control variables (family):</i>      |                     |                     |                     |                     |                     |                     |
| HH income (log, in 1000)                | 0.263*<br>(0.127)   | 0.254<br>(0.128)    | 0.299<br>(0.156)    | 0.293<br>(0.158)    | 0.406**<br>(0.135)  | 0.396**<br>(0.135)  |
| Migration background                    | 0.138<br>(0.114)    | 0.149<br>(0.113)    | 0.047<br>(0.170)    | 0.055<br>(0.172)    | -0.103<br>(0.157)   | -0.090<br>(0.156)   |
| West-GE (yes=1)                         | 0.091<br>(0.128)    | 0.085<br>(0.130)    | 0.232<br>(0.161)    | 0.218<br>(0.166)    | 0.049<br>(0.120)    | 0.019<br>(0.121)    |
| Mothers' working hours (h/week)         | -0.004<br>(0.003)   | -0.003<br>(0.003)   | -0.007<br>(0.004)   | -0.007<br>(0.004)   | -0.002<br>(0.004)   | -0.001<br>(0.004)   |
| No. siblings in hh                      | -0.071<br>(0.052)   | -0.061<br>(0.054)   | -0.074<br>(0.061)   | -0.068<br>(0.063)   | -0.027<br>(0.058)   | -0.015<br>(0.059)   |
| Single parent hh (yes=1)                | 0.028<br>(0.165)    | 0.051<br>(0.169)    | 0.222<br>(0.279)    | 0.239<br>(0.277)    | -0.103<br>(0.265)   | -0.073<br>(0.265)   |
| <i>Control variables (child):</i>       |                     |                     |                     |                     |                     |                     |
| Girl                                    | -0.033<br>(0.086)   | -0.028<br>(0.086)   | -0.031<br>(0.100)   | -0.027<br>(0.101)   | 0.394***<br>(0.095) | 0.400***<br>(0.095) |
| Child's age (month)                     | -0.017<br>(0.011)   | -0.017<br>(0.011)   | -0.012<br>(0.012)   | -0.012<br>(0.012)   | -0.000<br>(0.014)   | 0.000<br>(0.014)    |
| Educational activities (sum, preschool) | 0.015<br>(0.010)    | 0.015<br>(0.010)    | 0.022<br>(0.012)    | 0.022<br>(0.012)    | 0.025*<br>(0.010)   | 0.024*<br>(0.010)   |
| Child's health                          | -0.020<br>(0.078)   | -0.024<br>(0.078)   | -0.094<br>(0.097)   | -0.097<br>(0.096)   | 0.109<br>(0.086)    | 0.102<br>(0.087)    |
| <i>Lagged dependent variable:</i>       |                     |                     |                     |                     |                     |                     |
| Math ( $w_2$ , std, WLE)                | 0.522***<br>(0.050) | 0.521***<br>(0.050) |                     |                     |                     |                     |
| Cognitive abilities ( $w_2$ , std)      |                     |                     | 0.242***<br>(0.044) | 0.238***<br>(0.043) |                     |                     |
| Concentration ( $w_2$ , std)            |                     |                     |                     |                     | 0.259***<br>(0.058) | 0.254***<br>(0.059) |
| N                                       | 343                 | 343                 | 343                 | 343                 | 343                 | 343                 |

*Note.* Based on imputed sample. Standard errors in parentheses (clustered: day-care facility); hh=household. *Source.* SC2 v6-o-1.

\*  $p < 0.05$ . \*\*  $p < 0.01$ . \*\*\*  $p < 0.001$ .

**Table A10:** Multicollinearity Diagnostics for the LDV regressions

| Variable                                | DV Math<br>VIF | DV Reasoning<br>VIF | DV Concentration<br>VIF |
|---|----------------|---------------------|-------------------------|
| Math skills (std, w2)                   | 1.20           |                     |                         |
| Reasoning skills (std, w2)              |                | 1.08                |                         |
| Concentration skills (std, w2)          |                |                     | 1.13                    |
| Sports                                  | 1.20           | 1.19                | 1.19                    |
| Music                                   | 1.16           | 1.15                | 1.15                    |
| Reading to child                        | 1.21           | 1.23                | 1.22                    |
| Tertiary educ. degree (family)          | 1.37           | 1.36                | 1.40                    |
| HH equiv. income (log, in 1,000)        | 1.37           | 1.36                | 1.36                    |
| Migration background                    | 1.07           | 1.08                | 1.07                    |
| West Germany (yes = 1)                  | 1.31           | 1.31                | 1.31                    |
| Mother's working hours                  | 1.24           | 1.24                | 1.24                    |
| No. siblings in hh                      | 1.17           | 1.17                | 1.17                    |
| Single parent hh (yes = 1)              | 1.12           | 1.12                | 1.12                    |
| Girl (yes=1)                            | 1.08           | 1.08                | 1.09                    |
| Child's age (months)                    | 1.13           | 1.11                | 1.11                    |
| Educational activities (sum, preschool) | 1.10           | 1.05                | 1.06                    |
| Child's health                          | 1.04           | 1.04                | 1.04                    |

*Note.* VIF calculated with the STATA code `mivif` by Klein (2011).

*Source.* NEPS SC2 v6-0-1

## APPENDIX B

**Table B1:** Descriptive statistics of variables (sample from Waves 1 and 2).

|  | Mean/% | SD    | Min   | Max   | N    | No. missings | % missings |
|--|--------|-------|-------|-------|------|--------------|------------|
| <i>Parent-teacher contact</i>                    |        |       |       |       |      |              |            |
| never/seldom                                     | 13.00  | 0.43  | 0     | 1     | 1503 | 16           | 1.06       |
| sometimes  | 36.79  | 0.66  | 0     | 1     | 195  |              |            |
| often  | 37.48  | 0.63  | 0     | 1     | 553  |              |            |
| very often                                       | 12.73  | 0.46  | 0     | 1     | 563  |              |            |
| <i>Parental variables</i>                        |        |       |       |       |      |              |            |
| Highest educ. level (parent):                    |        |       |       |       | 1519 | 0            | 0.00       |
| Low education (CASMIN 1a/b/c)                    | 16.29  | 0.52  | 0.00  | 1.00  | 247  |              |            |
| Medium education (CASMIN 2a/b/c)                 | 61.32  | 0.66  | 0.00  | 1.00  | 932  |              |            |
| High education (CASMIN 3a/b)                     | 22.39  | 0.56  | 0.00  | 1.00  | 340  |              |            |
| Immigrant status                                 | 18.49  | 0.67  | 0.00  | 1.00  | 1519 |              |            |
| Equivalence household income (in steps of 1000€) | 1.55   | 0.95  | 0.12  | 8.57  | 1307 | 212          | 16.22      |
| Single parent household                          | 9.72   | 0.41  | 0.00  | 1.00  | 1519 | 0            | 0.00       |
| No. siblings in household                        | 1.09   | 1.19  | 0.00  | 8.00  | 1519 | 0            | 0.00       |
| Working hours (hrs/week)                         | 18.44  | 22.76 | 0.00  | 70.00 | 1512 | 7            | 0.46       |
| <i>Institutional &amp; teacher variables</i>     |        |       |       |       |      |              |            |
| Openness of institution                          | 0.15   | 0.43  | 0.00  | 1.07  | 1297 | 222          | 17.12      |
| Training in parental engagement                  | 14.98  | 0.45  | 0.00  | 1.00  | 1447 | 72           | 4.98       |
| Child-teacher ratio (group)                      | 12.40  | 6.68  | 2.91  | 37.88 | 1270 | 249          | 19.61      |
| <i>Control variables</i>                         |        |       |       |       |      |              |            |
| Antisocial behavior score (parent rating)        | 2.67   | 1.79  | 1.00  | 8.00  | 1492 | 27           | 1.81       |
| Antisocial behavior score (teacher rating)       | 3.95   | 3.12  | 1.00  | 11.00 | 1476 | 43           | 2.91       |
| Female child                                     | 50.13  | 0.67  | 0.00  | 1.00  | 1519 | 0            | 0.00       |
| Age of child (in months)                         | 62.49  | 5.76  | 50.00 | 77.00 | 1519 | 0            | 0.00       |
| Half-day childcare                               | 0.43   | 0.43  | 0.00  | 1.00  | 1515 | 4            | 0.26       |
| West Germany                                     | 84.49  | 0.44  | 0.00  | 1.00  | 1519 | 0            | 0.00       |
| Female respondent                                | 90.00  | 0.45  | 0.00  | 1.00  | 1519 | 0            | 0.00       |

*Source.* Author's own calculations based on NEPS SC2 8.0.0 (weighted)

**Table B2:** Ordered logistic regression predicting conversations of parents and teachers.

|  | Model 1  |         | Model 2  |         | Model 3            |         | Model 4   |         |
|--|----------|---------|----------|---------|--------------------|---------|-----------|---------|
|  | AME      | (SE)    | AME      | (SE)    | AME                | (SE)    | AME       | (SE)    |
| <i>Parental variables</i>                    |          |         |          |         |                    |         |           |         |
| Medium education (CASMIN 2a/b/c)             | -0.059*  | (0.027) | -0.056*  | (0.027) | -0.056*            | (0.027) | -0.066*   | (0.029) |
| High education (CASMIN 3a/b)                 | -0.089** | (0.028) | -0.083** | (0.030) | -0.085**           | (0.030) | -0.093**  | (0.032) |
| Immigrant status                             | -0.011   | (0.022) | -0.012   | (0.022) | -0.013             | (0.022) | -0.008    | (0.022) |
| Equivalence household income                 |          |         | -0.012   | (0.019) | -0.013             | (0.019) | -0.009    | (0.018) |
| Single parent household                      |          |         | -0.003   | (0.027) | -0.004             | (0.025) | -0.007    | (0.024) |
| Working hours (hrs/week)                     |          |         | 0.000    | (0.001) | 0.000              | (0.001) | -0.000    | (0.001) |
| No. siblings in household                    |          |         | -0.000   | (0.009) | -0.000             | (0.008) | -0.000    | (0.008) |
| <i>Institutional &amp; teacher variables</i> |          |         |          |         |                    |         |           |         |
| Openness of institution                      |          |         |          |         | 0.051 <sup>+</sup> | (0.030) | 0.066*    | (0.030) |
| Training in parental engagement              |          |         |          |         | 0.019              | (0.020) | 0.020     | (0.019) |
| Child-teacher ratio (group)                  |          |         |          |         | -0.001             | (0.001) | -0.002    | (0.001) |
| <i>Control variables</i>                     |          |         |          |         |                    |         |           |         |
| Antisocial behavior (parent rating)          |          |         |          |         |                    |         | -0.014*   | (0.006) |
| Antisocial behavior (teacher rating)         |          |         |          |         |                    |         | 0.001     | (0.004) |
| Female child                                 |          |         |          |         |                    |         | -0.024    | (0.017) |
| Age of child (in months)                     |          |         |          |         |                    |         | 0.002     | (0.002) |
| Half-day childcare                           |          |         |          |         |                    |         | -0.012    | (0.016) |
| West Germany                                 |          |         |          |         |                    |         | -0.063*** | (0.018) |
| Female respondent                            |          |         |          |         |                    |         | -0.003    | (0.028) |
| Observations                                 | 1519     |         | 1519     |         | 1519               |         | 1519      |         |

Source. Author's own calculations based on NEPS SC2 8.0.0 (weighted and imputed)

<sup>+</sup>  $p < .10$ , \*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$

**Table B3:** Logistic regression predicting frequent conversations of parents and teachers.

|  | AME                 | (SE)    |
|--|---------------------|---------|
| <i>Parental variables</i>                    |                     |         |
| Medium education (CASMIN 2a/b/c)             | −0.667**            | (0.224) |
| High education (CASMIN 3a/b)                 | −0.961**            | (0.298) |
| Immigrant status                             | −0.064              | (0.190) |
| Equivalence household income                 | −0.042              | (0.198) |
| Single parent household                      | −0.053              | (0.297) |
| Working hours (hrs/week)                     | 0.001               | (0.006) |
| No. siblings in household                    | −0.002              | (0.084) |
| <i>Institutional &amp; teacher variables</i> |                     |         |
| Openness of institution                      | 0.433               | (0.283) |
| Training in parental engagement              | 0.205               | (0.183) |
| Child-teacher ratio (group)                  | −0.013              | (0.014) |
| <i>Control variables</i>                     |                     |         |
| Antisocial behavior (parent rating)          | −0.175**            | (0.057) |
| Antisocial behavior (teacher rating)         | −0.010              | (0.032) |
| Female child                                 | −0.315 <sup>+</sup> | (0.161) |
| Age of child (in months)                     | 0.009               | (0.016) |
| Half-day childcare                           | −0.187              | (0.160) |
| West Germany                                 | −0.579**            | (0.183) |
| Female respondent                            | −0.081              | (0.278) |
| Observations                                 | 1519                |         |

*Source.* Author's own calculations based on NEPS SC2 8.0.0 (weighted and imputed)

<sup>+</sup>  $p < .10$ , \*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$



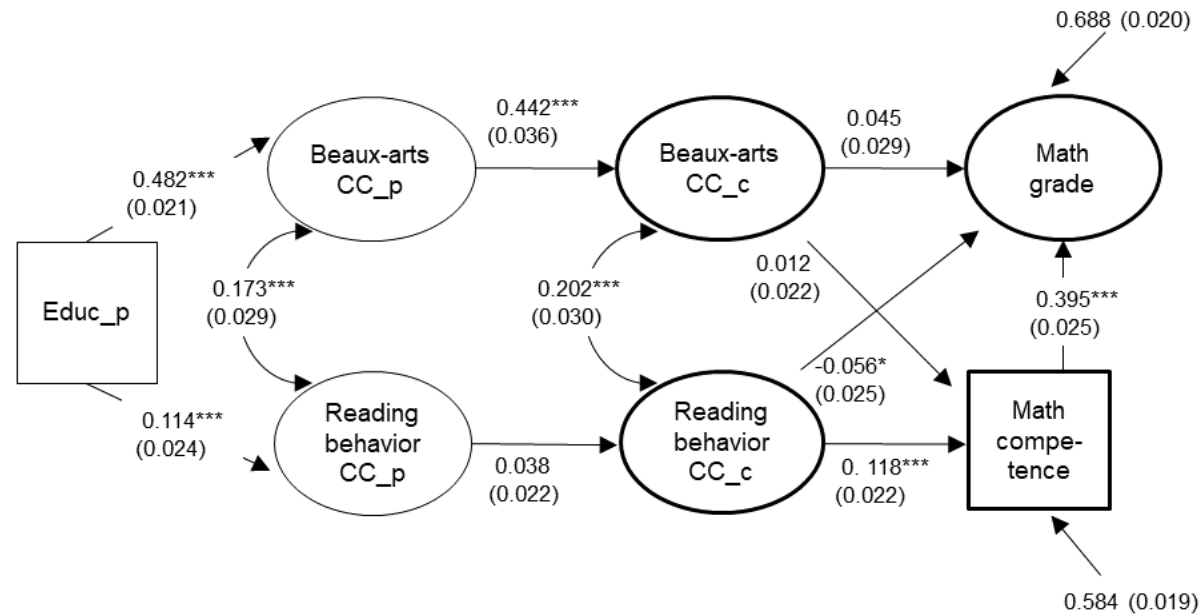
**Table B4:** Ordered logistic regression predicting conversations of parents and teachers.

|  | AME       | SE      |
|--|-----------|---------|
| <i>Parental variables</i>                    |           |         |
| Medium education (CASMIN 2a/b/c)             | −0.040    | (0.030) |
| High education (CASMIN 3a/b)                 | −0.070*   | (0.033) |
| Turkish origin                               | 0.083     | (0.057) |
| Former Soviet Union origin                   | −0.051*   | (0.022) |
| European origin                              | −0.031    | (0.028) |
| Other origin                                 | 0.116     | (0.083) |
| Equivalence household income                 | −0.010    | (0.018) |
| Single parent household                      | −0.007    | (0.024) |
| Working hours (hrs/week)                     | −0.000    | (0.001) |
| No. siblings in household                    | −0.001    | (0.008) |
| <i>Institutional &amp; teacher variables</i> |           |         |
| Openness of institution                      | 0.062*    | (0.030) |
| Training in parental engagement              | 0.023     | (0.018) |
| Child-teacher ratio (group)                  | −0.002    | (0.001) |
| <i>Control variables</i>                     |           |         |
| Antisocial behavior (parent rating)          | −0.014*   | (0.006) |
| Antisocial behavior (teacher rating)         | 0.001     | (0.004) |
| Female child                                 | −0.022    | (0.017) |
| Age of child (in months)                     | 0.002     | (0.002) |
| Half-day childcare                           | −0.017    | (0.015) |
| West Germany                                 | −0.060*** | (0.018) |
| Female respondent                            | 0.005     | (0.028) |
| Observations                                 | 1519      |         |

Source. Author's own calculations based on NEPS SC2 8.0.0 (weighted and imputed)

<sup>+</sup> $p < .10$ , \* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$

APPENDIX C



**Figure C1:** Path diagram and parameter estimates of the structural equation model.

*Note.* Standardized coefficients (STDYX) are given, with standard errors in parentheses. Some paths (e.g., path from parental education to child's academic outcomes) and additional covariates (child's gender, age, migration background, fluid intelligence, readiness for exertion, idealistic aspirations, parental school-related support) are omitted from the figure to facilitate readability. CC\_p = parental cultural capital, CC\_c = children's cultural capital, Educ\_p = parental education. Model-fit:  $\chi^2 = 512.137$  df(132);  $p < 0.000$ , CFI = 0.971, TLI = 0.960; RMSEA = .032 N = 2867. \* $p < .05$ , \*\*  $p < .01$ , \*\*\* $p < .001$ .

**Table C1:** Means/percentages, standard deviations, and results of the simultaneous confirmatory factor analysis (SCFA).

| Variables  | Mean / % | SD   | Range      | $\lambda^a$ |
|--|----------|------|------------|-------------|
| <b>Child:</b>  |          |      |            |             |
| <i>Performance in German<sup>bc</sup></i>            |          |      |            |             |
| German grade (child report)                          |          |      | 1/5        | 0.86        |
| 1 "poor/inadequate"                                  | 0.01     |      |            |             |
| 2 "poor"   | 0.11     |      |            |             |
| 3 "satisfactory"                                     | 0.44     |      |            |             |
| 4 "good"   | 0.36     |      |            |             |
| 5 "very good"  | 0.08     |      |            |             |
| German grade (parent report)                         |          |      | 1/5        | 0.89        |
| 1 "poor/inadequate"                                  | 0.01     |      |            |             |
| 2 "poor"   | 0.10     |      |            |             |
| 3 "satisfactory"                                     | 0.45     |      |            |             |
| 4 "good"   | 0.39     |      |            |             |
| 5 "very good"  | 0.06     |      |            |             |
| <i>Academic ability</i>                              |          |      |            |             |
| Reading competence (WLE score)                       | 0.83     | 1.32 | -3.25/5.79 |             |
| <i>Beaux-arts cultural capital<sup>b</sup></i>       |          |      |            |             |
| Museum/art exhibition visits                         |          |      | 1/5        | 0.72        |
| 1 "never"  | 0.21     |      |            |             |
| 2 "once"   | 0.27     |      |            |             |
| 3 "2 to 3 times"                                     | 0.32     |      |            |             |
| 4 "4 to 5 times"                                     | 0.11     |      |            |             |
| 5 "more than 5 times"                                | 0.10     |      |            |             |
| Classical concert/opera/ballet attendance            |          |      | 1/5        | 0.72        |
| 1 "never"  | 0.69     |      |            |             |
| 2 "once"   | 0.19     |      |            |             |
| 3 "2 to 3 times"                                     | 0.08     |      |            |             |
| 4 "4 to 5 times"                                     | 0.03     |      |            |             |
| 5 "more than 5 times"                                | 0.03     |      |            |             |
| Theatre  |          |      | 1/5        | 0.63        |
| 1 "never"  | 0.32     |      |            |             |
| 2 "once"   | 0.33     |      |            |             |
| 3 "2 to 3 times"                                     | 0.23     |      |            |             |
| 4 "4 to 5 times"                                     | 0.07     |      |            |             |
| 5 "more than 5 times"                                | 0.05     |      |            |             |
| <i>Reading behavior cultural capital<sup>b</sup></i> |          |      |            |             |
| Reading frequency (school day)                       |          |      | 1/5        | 0.76        |
| 1 "not at all outside school"                        | 0.10     |      |            |             |
| 2 "up to half an hour"                               | 0.27     |      |            |             |
| 3 "between half an hour and one hour"                | 0.28     |      |            |             |
| 4 "1 to 2 hours"                                     | 0.21     |      |            |             |
| 5 "more than 2 hours"                                | 0.13     |      |            |             |
| Reading frequency (non-school day)                   |          |      | 1/5        | 0.94        |
| 1 "not at all outside school"                        | 0.12     |      |            |             |
| 2 "up to half an hour"                               | 0.25     |      |            |             |
| 3 "between half an hour and one hour"                | 0.20     |      |            |             |
| 4 "1 to 2 hours"                                     | 0.21     |      |            |             |
| 5 "more than 2 hours"                                | 0.22     |      |            |             |
| <b>Parent:</b>                                       |          |      |            |             |
| <i>Beaux-arts cultural capital<sup>b</sup></i>       |          |      |            |             |
| Museum/art exhibition visits                         |          |      | 1/5        | 0.71        |
| 1 "never"  | 0.22     |      |            |             |
| 2 "once"   | 0.21     |      |            |             |
| 3 "2 to 3 times"                                     | 0.37     |      |            |             |
| 4 "4 to 5 times"                                     | 0.12     |      |            |             |
| 5 "more than 5 times"                                | 0.09     |      |            |             |
| Classical concert/opera/ballet attendance            |          |      | 1/5        | 0.75        |
| 1 "never"  | 0.60     |      |            |             |
| 2 "once"   | 0.17     |      |            |             |

|  |       |      |      |      |
|--|-------|------|------|------|
| 3 "2 to 3 times"                                     | 0.16  |      |      |      |
| 4 "4 to 5 times"                                     | 0.03  |      |      |      |
| 5 "more than 5 times"                                | 0.04  |      |      |      |
| Theatre  |       |      | 1/5  | 0.68 |
| 1 "never"  | 0.45  |      |      |      |
| 2 "once"   | 0.24  |      |      |      |
| 3 "2 to 3 times"                                     | 0.23  |      |      |      |
| 4 "4 to 5 times"                                     | 0.04  |      |      |      |
| 5 "more than 5 times"                                | 0.04  |      |      |      |
| <i>Reading behavior cultural capital<sup>b</sup></i> |       |      |      |      |
| Reading frequency (work day)                         | 0.94  | 0.79 | 0/10 | 0.58 |
| Reading frequency (day off)                          | 1.38  | 1.05 | 0/10 | 0.99 |
| <b>Other covariates</b>                              |       |      |      |      |
| Migration background (child, 1 = yes)                | 0.19  |      | 0/1  |      |
| Gender (child, 1= female)                            | 0.49  |      | 0/1  |      |
| Age (child)  | 10.45 | 0.57 | 9/12 |      |
| Fluid intelligence (child)                           | 7.19  | 2.57 | 0/12 |      |
| Readiness for exertion (child)                       | 8.88  | 1.89 | 3/12 |      |
| Idealistic academic aspirations (child)              | 1.72  | 0.54 | 0/2  |      |
| Parental school-related support                      | 8.73  | 1.87 | 3/12 |      |
| Parental years of education                          | 14.65 | 2.33 | 9/18 |      |

*Source.* Author's calculations based on NEPS SC3 6.0.1

Model fit for SCFA:  $\chi^2 = 296.862$   $df(45)$ ;  $p < 0.000$ , CFI = 0.985, TLI = 0.979; RMSEA = .033; N for SCFA = 5182

<sup>a</sup> Standardized factor loadings (STDYX) (all significant).

<sup>b</sup> Latent construct.

<sup>c</sup> Scale inverted.

**Table C2:** Structural equation model (SEM) for German grades and reading test scores.

|   | German grades       |                |     | Reading score |                |     |
|---|---------------------|----------------|-----|---------------|----------------|-----|
| Beaux-arts cultural capital (child)       | 0.230               | (0.046)        | *** | -0.048        | (0.037)        |     |
|   | <i>0.149</i>        | <i>(0.026)</i> | *** | <i>-0.034</i> | <i>(0.026)</i> |     |
| Reading behavior cultural capital (child) | 0.061               | (0.029)        | *   | 0.235         | (0.025)        | *** |
|   | <i>0.052</i>        | <i>(0.024)</i> | *   | <i>0.222</i>  | <i>(0.023)</i> | *** |
| Parental education                        | 0.077               | (0.014)        | *** | 0.073         | (0.011)        | *** |
|   | <i>0.123</i>        | <i>(0.021)</i> | *** | <i>0.128</i>  | <i>(0.019)</i> | *** |
| Migration background (child, 1 = yes)     | -0.230              | (0.076)        | **  | -0.090        | (0.067)        |     |
|   | <i>-0.062</i>       | <i>(0.020)</i> | **  | <i>-0.027</i> | <i>(0.020)</i> |     |
| Age (child)                               | -0.014              | (0.056)        |     | -0.109        | (0.042)        | **  |
|   | <i>-0.006</i>       | <i>(0.022)</i> |     | <i>-0.047</i> | <i>(0.018)</i> | **  |
| Gender (child, 1 = female)                | 0.441               | (0.069)        | *** | 0.158         | (0.057)        | **  |
|   | <i>0.152</i>        | <i>(0.022)</i> | *** | <i>0.060</i>  | <i>(0.021)</i> | **  |
| Fluid intelligence (child)                | 0.017               | (0.013)        |     | 0.131         | (0.011)        | *** |
|   | <i>0.030</i>        | <i>(0.023)</i> |     | <i>0.255</i>  | <i>(0.019)</i> | *** |
| Readiness for exertion (child)            | 0.190               | (0.020)        | *** | 0.073         | (0.014)        | *** |
|   | <i>0.246</i>        | <i>(0.019)</i> | *** | <i>0.104</i>  | <i>0.020</i>   | *** |
| Idealistic academic aspirations (child)   | -0.022              | (0.067)        |     | 0.436         | (0.056)        | *** |
|   | <i>-0.008</i>       | <i>(0.025)</i> |     | <i>0.176</i>  | <i>(0.023)</i> | *** |
| Parental school-related support           | 0.020               | (0.016)        |     | -0.041        | (0.015)        | **  |
|   | <i>0.025</i>        | <i>(0.020)</i> |     | <i>-0.058</i> | <i>(0.020)</i> | **  |
| Reading score (child)                     | 0.358               | (0.038)        | *** |               |                |     |
|   | <i>0.326</i>        | <i>(0.025)</i> | *** |               |                |     |
| R <sup>2</sup>                            | 0.366               |                |     | 0.302         |                |     |
| N   | 2975                |                |     |               |                |     |
| Model fit:                                |                     |                |     |               |                |     |
| χ <sup>2</sup> (df)                       | 524.801 (132)       |                |     |               |                |     |
| RMSEA (90% CI)                            | 0.032 (0.029 0.034) |                |     |               |                |     |
| CFI                                       | 0.967               |                |     |               |                |     |
| TLI                                       | 0.952               |                |     |               |                |     |

*Source.* Author's own calculations based on NEPS SC3 6.0.1

*Note.* Unstandardized coefficients, standard errors in parentheses (clustered: school), standardized coefficients (STDYX) in italics.

\* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$

**Table C3:** Structural equation model (SEM) for German grades and reading test scores.

|  | Effect decomposition<br>(parental education -><br>German grades) | Effect decomposition<br>(parental education -><br>reading score) |
|--|--|--|
|  | Parental education   | Parental education   |
| Total effects                                      | 0.146 (0.017) ***<br><i>0.233</i>                                | 0.116 (0.011) ***<br><i>0.205</i>                                |
| Total indirect effects                             | 0.069 (0.009) ***<br><i>0.110</i>                                | 0.044 (0.007) ***<br><i>0.077</i>                                |
| Specific indirect effects                          |  |  |
| Via parents' and children's beaux-arts consumption | 0.023 (0.005) ***<br><i>0.036</i>                                | -0.005 (0.004)<br><i>-0.008</i>                                  |
| Via parents' and children's reading behavior       | 0.000 (0.000)<br><i>0.000</i>                                    | 0.001 (0.000)<br><i>0.001</i>                                    |
| Via children's beaux-arts consumption              | 0.000 (0.003)<br><i>0.000</i>                                    | 0.000 (0.001)<br><i>0.000</i>                                    |
| Via children's reading behavior                    | 0.005 (0.003) *<br><i>0.009</i>                                  | 0.021 (0.004) ***<br><i>0.037</i>                                |
| Direct effect                                      | 0.077 (0.014) ***<br><i>0.123</i>                                | 0.073 (0.011) ***<br><i>0.128</i>                                |

*Source.* Author's own calculations based on NEPS SC3 6.o.1

*Note.* Unstandardized coefficients, standard errors in parentheses (clustered: school), standardized coefficients (STDYX) in italics. Results belong to the estimated SEM shown in Table C2.

\*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$