Children's conversion of cultural capital into educational success: The symbolic and skill-generating functions of cultural capital

Karoline Mikus[1], Nicole Tieben[1] & Pia S. Schober[1]

[1] University of Tübingen

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.

Word count: 8189 (incl. references)

Introduction

One of the most prominent sociological explanations of social inequality in education is Bourdieu's cultural reproduction theory (Bourdieu 1986; Bourdieu and 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 (de Graaf 1986; Farkas et al. 1990; Jæger 2011; Bodovski, Jeon, and Byun 2016; van de Werfhorst and 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 and 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 and 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 and Lareau 1988: 155). Students, who are not socialized into the preferences, attitudes, and behaviours 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 1997; de Graaf, de Graaf, and Kraaykamp 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 Krarup and Munk, 2015 for a recent discussion). 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 and Breen 2016; Roscigno and 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 (Dumais 2002; DiMaggio 1982; 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 (Leopold and Shavit 2013; de Graaf, de Graaf, and Kraaykamp 2000). 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.

Conversion of Children's Cultural Capital

There has been a long-standing debate about the conceptualization and measurement of cultural capital (Lamont and Lareau 1988; Kingston 2001). 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, behaviours, 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, de Graaf, and Kraaykamp 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 and Eitle 2002; Kaufman and Gabler 2004; Roscigno and 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 (Kaufman and Gabler 2004; de Graaf 1989). Other researchers have used grades or grade point averages during high school (Crook 1997; DiMaggio 1982) or standardized test scores (Bodovski, Jeon, and Byun 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 behaviour or visiting performing arts (Bodovski, Jeon, and Byun 2016; de Graaf 1989), some researchers have referred to cultural classes and cultural trips (Roscigno and Ainsworth Darnell 1999) or discussions about culture in the family context (Jæger 2009; Jæger and Møllegaard 2017).

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

distinguishing active cultural participation and cultural consumption indicate that active cultural participation may be a stronger predictor of academic outcomes (Roscigno and 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.[1] For instance, reading behaviour is considered as a form of cultural capital, and is at the same time of intrinsic value because it contributes to children's reading and language skills (*skill-generating function* of cultural capital) (de Graaf, de Graaf, and Kraaykamp 2000; Evans et al. 2010; Kingston 2001; Barone 2006; de Graaf and de Graaf 2002).

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. Lamont and Lareau 1988; Weber 1968; DiMaggio 1982). For instance, children and their parents display their cultural capital when interacting with teachers in school, and this behaviour may influence the teachers' impression and assessment of a child. This mechanism hence assumes that teachers are biased

---

[1] 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.

towards students who adopt and display middle-class behaviour. 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). [2] 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 and Breen 2016; Roscigno and 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 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

---

[2] 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.

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 behaviour directly stimulates children's competence development, reading behaviour will be associated with higher competence test scores of children (Leopold and 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 behaviour 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 behaviour, we hence expect that

Hypothesis 2a (symbolic function): Children's reading behaviour 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. [3]

Data, Method and Operationalization

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

---

[3] Some interpreters of Bourdieu argue that academic ability and cultural capital cannot be separated (Lareau and 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.

(Blossfeld, Roßbach, and Maurice 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.[4] 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 complete classrooms within each school were randomly selected (for details see Aßmann et al. 2011; Steinhauer and 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.

---

[4] 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.

Modelling Strategy

We estimated structural equation models (SEM) with latent variables using Mplus7 (Muthén and 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 behaviour 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 behaviour 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 behaviour 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 and 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 (6th 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 and 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.

Operationalization

Descriptive statistics for the variables can be found in the appendix (Table A1). 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

14

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 behaviour was measured with two ordinal items capturing children's self-reported leisure reading behaviour. 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 behaviour to measure *parental reading behaviour*. 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 (see Korupp, Ganzeboom, and van der Lippe 2002 for a discussion of alternative specifications of parental education). Each respondent's years of education were calculated by the NEPS team based on the Comparative 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, Lüttinger and Müller 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 behaviour 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.

Results

Bivariate Statistics

We began our analysis by calculating bivariate correlation coefficients (see Table 1). In line with our argument, children's reading behaviour was positively and significantly correlated with reading competence ($\rho = .29$, *p* $< .001$). Children's reading behaviour 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 1]

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 behaviour to 1. Applying commonly used cut-off criteria (Hu and Bentler 1999; Browne and Cudeck 1992), 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 A1 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 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 A2). 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 behaviour), children's reading behaviour 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 per cent 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 1]

The coefficient of children's reading behaviour on German grades is significant but small (beta = .052, $SE = 0.024$, $p < .05$), which confirms hypothesis 1b (symbolic function of reading behaviour). 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 behaviour is small and not significant on the 5 per cent-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 behaviour 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 A2), 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.

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 online Appendix, Figure S1). 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 behaviour 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 behaviour 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.

Summary 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 behaviour 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 and Breen 2016) and in line with our hypothesis, we found a positive

23

association between children's reading behaviour and academic competencies (H1a). Furthermore, children's reading behaviour 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 behaviour 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 and 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.

References

Aschaffenburg, Karen, and Ineke Maas. 1997. "Cultural and Educational Careers: The Dynamics of Social Reproduction." *American Sociological Review* 62 (4): 573–87.

Aßmann, Christian, Hans W. Steinhauer, Hans Kiesl, Solange Koch, Benno Schönberger, André Müller-Kuller, Götz Rohwer, Susanne Rässler, and Hans-Peter Blossfeld. 2011. "Sampling Designs of the National Educational Panel Study: Challenges and Solutions." *Zeitschrift für Erziehungswissenschaft* 14: 51–65.

Barone, Carlo. 2006. "Cultural Capital, Ambition and the Explanation of Inequalities in Learning Outcomes: A Comparative Analysis." *Sociology* 40 (6): 1039–58. doi:10.1177/0038038506069843.

Blossfeld, Hans-Peter, Hans-Günther Roßbach, and Jutta von Maurice. 2011. "Education as a Lifelong Process – The German National Educational Panel Study (NEPS)." *Zeitschrift für Erziehungswissenschaft* Special Issue (14). doi:10.5157/NEPS:SC3:6.0.1.

Bodovski, Katerina, Haram Jeon, and Soo-yong Byun. 2016. "Cultural Capital and Academic Achievement in Post-Socialist Eastern Europe." *British Journal of Sociology of Education* 38 (6): 887–907. doi:10.1080/01425692.2016.1202746.

Bourdieu, Pierre. 1974. "The School as a Conservative Force: Scholastic and Cultural Inequalities." In *Contemporary Research in the Sociology of Education*, edited by John Eggleston. 1. publ, 32–46. London: Methuen.

Bourdieu, Pierre. 1986. "The Forms of Capital." In *Handbook of Theory and Research for the Sociology of Education*, edited by John G. Richardson, 241–58. New York: Greenwood Press.

Bourdieu, Pierre, and Jean-Claude Passeron. 1971. *Die Illusion der Chancengleichheit: Untersuchungen zur Soziologie des Bildungswesens am Beispiel Frankreichs.* Texte und Dokumente zur Bildungsforschung. Stuttgart: Klett.

Bourdieu, Pierre, and Jean-Claude Passeron. 1977. *Reproduction: In Education, Society and Culture.* London: SAGE Publications.

Browne, Michael W., and Robert Cudeck. 1992. "Alternative Ways of Assessing Model Fit." *Sociological Methods & Research* 21 (2): 230–58. doi:10.1177/0049124192021002005.

Cattell, R. B. 1987. *Intelligence: Its Structure, Growth and Action*. 1st ed. Amsterdam: Elsevier.

Crook, Christopher J. 1997. *Cultural Practices and Socioeconomic Attainment: The Australian Experience.* Contributions in Sociology. Westport, Connecticut: Greenwood Press.

de Graaf, Nan D., and Paul M. de Graaf. 2002. "Formal and Popular Dimensions of Cultural Capital: Effects on Children's Educational Attainment." *The Netherlands' Journal of Social Science* 38 (2): 167–86.

de Graaf, Nan D., Paul M. de Graaf, and Gerbert Kraaykamp. 2000. "Parental Cultural Capital and Educational Attainment in the Netherlands: A Refinement of the Cultural Capital Perspective." *Sociology of Education* 73 (2): 92–111. doi:10.2307/2673239.

de Graaf, Paul M. 1986. "The Impact of Financial and Cultural Resources on Educational Attainment in the Netherlands." *Sociology of Education* 59 (4): 237–46. doi:10.2307/2112350.

de Graaf, Paul M. 1989. "Cultural Reproduction and Educational Stratification." In *Educational Opportunities in the Welfare State: Longitudinal Studies in Educational and Occupational Attainment in the Netherlands*, edited by B. Bakker, J. Dronkers, and W. Meynen, 39–57. Nijmegen: Instituut voor Toegepaste Sociale Wetenschappen.

DiMaggio, Paul. 1982. "Cultural Capital and School Success: The Impact of Status Culture Participation on the Grades of U.S. High School Students." *American Sociological Review* 47 (2): 189–201.

Dumais, Susan A. 2002. "Cultural Capital, Gender, and School Success: The Role of Habitus."

   Sociology of Education 75 (1): 44–68. doi:10.2307/3090253.

Eitle, Tamela M., and David J. Eitle. 2002. "Race, Cultural Capital, and the Educational Effects

   of Participation in Sports." *Sociology of Education* 75 (2): 123–46. doi:10.2307/3090288.

Evans, M.D.R., Jonathan Kelley, Joanna Sikora, and Donald J. Treiman. 2010. "Family

   Scholarly Culture and Educational Success: Books and Schooling in 27 Nations." *Research in

   Social Stratification and Mobility* 28 (2): 171–97. doi:10.1016/j.rssm.2010.01.002.

Farkas, George, Robert P. Grobe, Daniel Sheehan, and Yuan Shuan. 1990. "Cultural Resources

   and School Success: Gender, Ethnicity, and Poverty Groups within an Urban School District."

   American Sociological Review 55 (1): 127–42.

Gehrer, Karin, Stefan Zimmermann, Cordula Artelt, and Sabine Weinert. 2012. *The Assessment

   of Reading Competence (Including Sample Items for Grade 5 and 9). Scientific Use File 2012,

   Version 1.0.0.* Bamberg: University of Bamberg, National Educational Panel Study.

Goldthorpe, John H. 2007. "`Cultural Capital'": Some Critical Observations." *Sociologica*

   1(2):1-23.

Hu, Li-tze, and Peter M. Bentler. 1999. "Cutoff Criteria for Fit Indexes in Covariance Structure

   Analysis: Conventional Criteria versus New Alternatives." *Structural Equation Modeling: A

   Multidisciplinary Journal* 6 (1): 1–55. doi:10.1080/10705519909540118.

Jæger, Mads M. 2008. "Cultural Capital and Teacher Ability Rating." *Social Policy and Welfare

   Services Working Paper* 10.

Jæger, Mads M. 2009. "Equal Access but Unequal Outcomes: Cultural Capital and Educational

   Choice in a Meritocratic Society." *Social Forces* 87 (4): 1943–71. doi:10.1353/sof.0.0192.

Jæger, Mads M. 2011. "Does Cultural Capital Really Affect Academic Achievement? New Evidence from Combined Sibling and Panel Data." *Sociology of Education* 84 (4): 281–98. doi:10.1177/0038040711417010.

Jæger, Mads M., and Richard Breen. 2016. "A Dynamic Model of Cultural Reproduction." *American Journal of Sociology* 112 (4): 1079–1115.

Jæger, Mads M., and Stine Møllegaard. 2017. "Cultural Capital, Teacher Bias, and Educational Success: New Evidence from Monozygotic Twins." *Social Science Research* 65: 130–44.

Kaufman, Jason, and Jay Gabler. 2004. "Cultural Capital and the Extracurricular Activities of Girls and Boys in the College Attainment Process." *Poetics* 32 (2): 145–68. doi:10.1016/j.poetic.2004.02.001.

Kingston, Paul W. 2001. "The Unfulfilled Promise of Cultural Capital Theory." *Sociology of Education* 74: 88–99.

König, Wolfgang, Paul Lüttinger, and Walter Müller. 1988. *A Comparative Analysis of the Development and Structure of Educational Systems. Methodological Foundations and the Construction of a Comparative Educational Scale.* CASMIN Working Paper No. 12. Mannheim: University of Mannheim.

Korupp, Sylvia E., Harry B. G. Ganzeboom, and Tanja van der Lippe. 2002. "Do Mothers Matter? A Comparison of Models of the Influence of Mothers' and Fathers' Educational and Occupational Status on Children's Educational Attainment." *Quality and Quantity* 36 (1): 17–42. doi:10.1023/A:1014393223522.

Krarup, Troels, and Martin D. Munk. 2015. "Field theory in cultural capital studies of educational attainment." *British Journal of Sociology of Education* 37 (5): 761-779. doi:10.1080/01425692.2014.969398.

Lamont, Michele, and Annette Lareau. 1988. "Cultural Capital: Allusions, Gaps and Glissandos in Recent Theoretical Developments." *Sociological Theory* 6 (2): 153–68. doi:10.2307/202113.

Lang, Frieder R., Stefan Kamin, Margund Rohr, Conrad Stünkel, and Bettina Willinger. 2014. *Erfassung der fluiden kognitiven Leistungsfähigkeit über die Lebensspanne im Rahmen des Nationalen Bildung spanels: Abschlussbericht zu einer NEPS -Ergänzungsstudie (NEPS Working Paper No. 43).* Bamberg: Leibniz-Institut für Bildungsverläufe, Nationales Bildungspanel.

Lareau, Annette, and Elliot B. Weininger. 2003. "Cultural Capital in Educational Research: A Critical Assessment." *Theory and Society* 32 (5/6): 567–606.

Leopold, Liliya, and Yossi Shavit. 2013. "Cultural Capital Does Not Travel Well: Immigrants, Natives and Achievement in Israeli Schools." *European Sociological Review* 29 (3): 450–63. doi:10.1093/esr/jcr086.

Maaz, Kai, Marko Neumann, Ulrich Trautwein, Wolfgang Wendt, Rainer Lehmann, and Jürgen Baumert. 2008. "Der Übergang von der Grundschule in die weiterführende Schule. Die Rolle von Schüler- und Klassenmerkmalen beim Einschätzen der individuellen Lernkompetenz durch die Lehrkräfte." *Schweizerische Zeitschrift für Bildungswissenschaften* 30 (3): 519–48.

Muthén, Linda K., and Bengt O. Muthén. 1998-2015. *Mplus User's Guide. Seventh Edition.* Los Angeles, CA: Muthén & Muthén.

Paino, Maria, and Linda A. Renzulli. 2013. "Digital Dimension of Cultural Capital: The (In)Visible Advantages for Students Who Exhibit Computer Skills." *Sociology of Education* 86 (2): 124–38. doi:10.1177/0038040712456556.

Pohl, Steffi, Kerstin Haberkorn, Katinka Hardt, and Elena Wiegand. 2012. *NEPS Technical Report for Reading – Scaling Results of Starting Cohort 3 in Fifth Grade (NEPS Working Paper No. 15).* Bamberg: Otto-Friedrich-Universität, Nationales Bildungspanel.

Roscigno, Vincent J., and James W. Ainsworth Darnell. 1999. "Race, Cultural Capital, and Educational Resources: Persistent Inequalities and Achievement Returns." *Sociology of Education* 72 (3): 158–78.

Steinhauer, Hans W., and Sabine Zinn. 2016. *NEPS Technical Report for Weighting: Weighting the Sample of Starting Cohort 3 of the National Educational Panel Study (Waves 1 to 5).* Bamberg: Leibniz Institute for Educational Trajectories, National Educational Panel Study.

Sullivan, Alice. 2001. "Cultural Capital and Educational Attainment." *Sociology* 35 (4): 893–912.

van de Werfhorst, Herman G., and Saskia Hofstede. 2007. "Cultural Capital or Relative Risk Aversion? Two Mechanisms for Educational Inequality Compared." *The British Journal of Sociology* 58 (3): 391–415. doi:10.1111/j.1468-4446.2007.00157.x.

Warm, Thomas A. 1989. "Weighted Likelihood Estimation of Ability in Item Response Theory." *Psychometrika* 54 (3): 427–50. doi:10.1007/BF02294627.

Weber, Max. 1968. *Economy and society: An Outline of Interpretive Sociology.* 3 vols. New York: Bedminster Press.

Wildhagen, Tina. 2009. "Why Does Cultural Capital Matter for High School Academic Performance? An Empirical Assessment of Teacher-Selection and Self-Selection Mechanisms as Explanations of the Cultural Capital Effect." *The Sociological Quarterly* (50): 173–200.

Tables

Table 1. Bivariate correlation coefficients for key variables.

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

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

Note: Pairwise Spearman correlations. Coefficients significant on the 5% level in bold. Weighted sum indices were used for latent constructs.

Figures
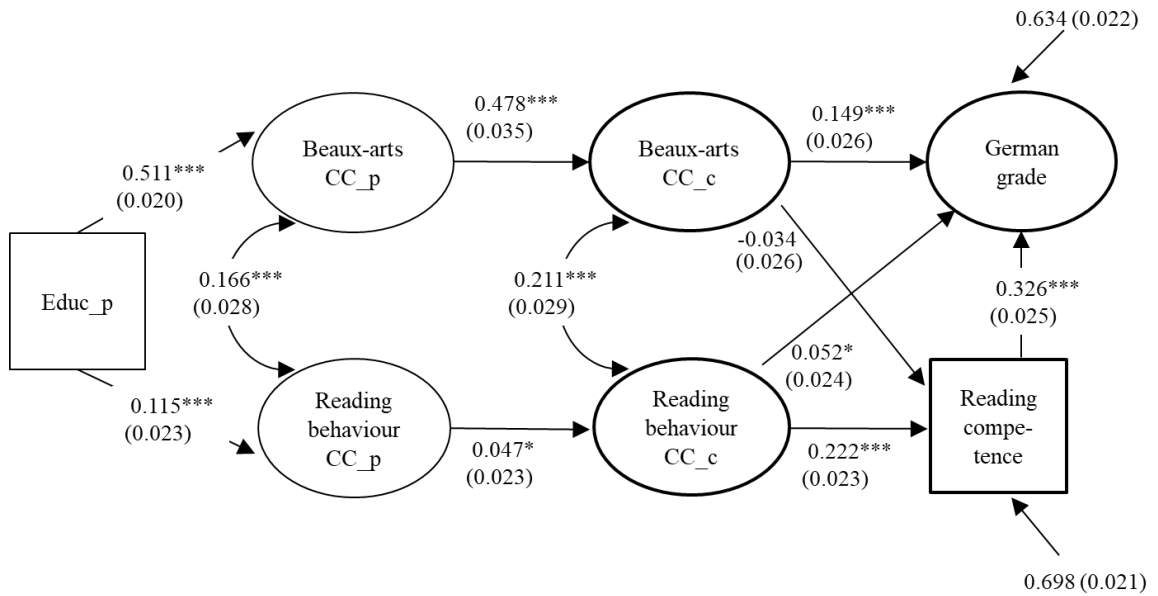
Figure 1. Path diagram and parameter estimates of the structural equation model with additional paths from reading behaviour (child) to German grade and beaux-arts consumption (child) to reading competence.

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

Appendices

Table A1. Means/percentages, standard deviations, and results of the simultaneous confirmatory factor analysis (SCFA).

Variables	Mean / %	SD	Range	λ[a]
Child:				
Performance in German [bc]				
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			
Academic ability				
Reading competence (WLE score)	0.83	1.32	-3.25 / 5.79	
Beaux-arts cultural capital [b]				
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			
Reading behaviour cultural capitalb				
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			

Parent:

Beaux-arts cultural capital [b]

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			

Reading behaviour cultural capital[b]

Reading frequency (work day)	0.94	0.79	0 / 10	0.58
Reading frequency (day off)	1.38	1.05	0 / 10	0.99
Other covariates				
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

[a]Standardized factor loadings (STDYX) (all significant).

[b]Latent construct.

[c]Scale inverted.

Table A2. 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)
	0.149 (0.026) ***	*-0.034 (0.026)*
Reading behaviour cultural capital (child)	0.061 (0.029) *	0.235 (0.025) ***
	0.052 (0.024) *	*0.222 (0.023) ****
Parental education	0.077 (0.014) ***	0.073 (0.011) ***
	0.123 (0.021) ***	*0.128 (0.019) ****
Migration background (child, 1 = yes)	-0.230 (0.076) **	-0.090 (0.067)
	-0.062 (0.020) **	*-0.027 (0.020)*
Age (child)	-0.014 (0.056)	-0.109 (0.042) **
	-0.006 (0.022)	*-0.047 (0.018) ***
Gender (child, 1 = female)	0.441 (0.069) ***	0.158 (0.057) **
	0.152 (0.022) ***	*0.060 (0.021) ***
Fluid intelligence (child)	0.017 (0.013)	0.131 (0.011) ***
	0.030 (0.023)	*0.255 (0.019) ****
Readiness for exertion (child)	0.190 (0.020) ***	0.073 (0.014) ***
	0.246 (0.019) ***	*0.104 0.020 ****
Idealilstic academic aspirations (child)	-0.022 (0.067)	0.436 (0.056) ***
	-0.008 (0.025)	*0.176 (0.023) ****
Parental school-related support	0.020 (0.016)	-0.041 (0.015) **
	0.025 (0.020)	*-0.058 (0.020) ***
Reading score (child)	0.358 (0.038) ***	
	0.326 (0.025) ***	
R^2	0.366	0.302
N	2975	
Model fit:		
χ^2 (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 (clusterd: school), standardized coefficients (STDYX) in italics

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

Table A3. Effect decomposition of the effects of parental education on German grades and reading competence scores.

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

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

Note: Unstandardized coefficients, standard errors in parentheses (clusterd: school), standardized coefficients (STDYX) in italics. Results belong to the estimated SEM shown in Table A2.

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

Appendices (online)

Table S1. Structural equation model with all estimated paths.

	β_{stdxy}	StdError	p-value
German grade ON			
Beaux-arts CC_c	0.149	0.026	0.000
Reading behaviour CC_c	0.052	0.024	0.032
Parental education	0.123	0.021	0.000
Migration background (child, 1 = yes)	-0.062	0.020	0.003
Age (child)	-0.006	0.022	0.796
Gender of (child, 1 = female)	0.152	0.022	0.000
Fluid intelligence (child)	0.030	0.023	0.189
Readiness for exertion (child)	0.246	0.019	0.000
Idealistic aspirations (child)	-0.008	0.025	0.739
Parental school-related support	0.025	0.020	0.213
Reading test score (child)	0.326	0.025	0.000
R^2	0.366		
Reading test score ON			
Beaux-arts CC_c	-0.034	0.026	0.195
Reading behaviour CC_c	0.222	0.023	0.000
Parental education	0.128	0.019	0.000
Migration background (child, 1 = yes)	-0.027	0.020	0.178
Age (child)	-0.047	0.018	0.009
Gender of child (1 = female)	0.060	0.021	0.006
Fluid intelligence (child)	0.255	0.019	0.000
Readiness for exertion (child)	0.104	0.020	0.000
Idealistic aspirations (child)	0.176	0.023	0.000
Parental school-related support	-0.058	0.020	0.005
R^2	0.302		
Idealistic aspirations ON			
Beaux-arts CC_c	0.121	0.026	0.000
Reading behaviour CC_c	0.087	0.018	0.000
Parental education	0.223	0.021	0.000
Migration background (child, 1 = yes)	0.071	0.019	0.000
Age (child)	-0.097	0.016	0.000
Gender of child (1 = female)	0.003	0.020	0.889
Fluid intelligence (child)	0.184	0.019	0.000
R^2	0.175		

Beaux-arts CC_c ON			
Beaux-arts CC_p	0.478	0.035	0.000
Parental education	0.001	0.030	0.970
Migration background (child, 1 = yes)	0.085	0.022	0.000
Age (child)	-0.023	0.025	0.360
Gender of child (1 = female)	0.077	0.027	0.004
Fluid intelligence (child)	-0.017	0.028	0.547
R^2	0.233		
Reading behaviour CC_c ON			
Reading behaviour CC_p	0.047	0.023	0.038
Parental education	0.167	0.024	0.000
Migration background (child, 1 = yes)	0.021	0.022	0.332
Age (child)	-0.041	0.019	0.028
Gender of child (1 = female)	0.138	0.025	0.000
Fluid intelligence (child)	0.106	0.021	0.000
R^2	0.073		
Beaux-arts CC_p ON			
Parental education	0.511	0.020	0.000
Migration background (child, 1 = yes)	-0.014	0.022	0.528
R^2	0.265		
Reading behaviour CC_p ON			
Parental education	0.115	0.023	0.000
Migration background (child, 1 = yes)	0.071	0.021	0.001
R^2	0.015		
Covariances			
Beaux-arts CC_p WITH	0.166	0.028	0.000
Reading behaviour CC_p			
Reading behaviour CC_c WITH	0.211	0.029	0.000
Beaux-arts CC_c			
Residual Variances			
Reading workday_p	0.627	0.045	0.000
Reading holiday_p	0.175	0.098	0.076
Reading test score	0.698	0.021	0.000
Idealistic aspirations	0.825	0.016	0.000
Beaux-arts CC_c	0.767	0.028	0.000
Reading behaviour CC_c	0.927	0.012	0.000
Beaux-arts CC_p	0.735	0.019	0.000
Reading behaviour CC_p	0.985	0.005	0.000
German grade	0.634	0.022	0.000

Source: Author's own calculations based on NEPS SC3 6.0.1

Note: CCc = cultural capital child, CCp = cultural capital parent; N = 2975.

Model fit: $\chi2 = 524.801$ df(132), $p < 0.000$; CFI = 0.967; TLI = 0.952; RMSEA = .032

Beaux-arts CC_p → Beaux-arts CC_c: 0.442*** (0.036)

0.688 (0.020)

Educ_p

0.482*** (0.021)

0.173*** (0.029)

0.114*** (0.024)

Beaux-arts CC_p

Reading behavior CC_p

0.202*** (0.030)

0.038 (0.022)

Beaux-arts CC_c

Reading behavior CC_c

0.045 (0.029)

0.021 (0.022)

-0.056* (0.025)

0. 118*** (0.022)

Math grade

Math compe-tence

0.395*** (0.025)

0.584 (0.020)
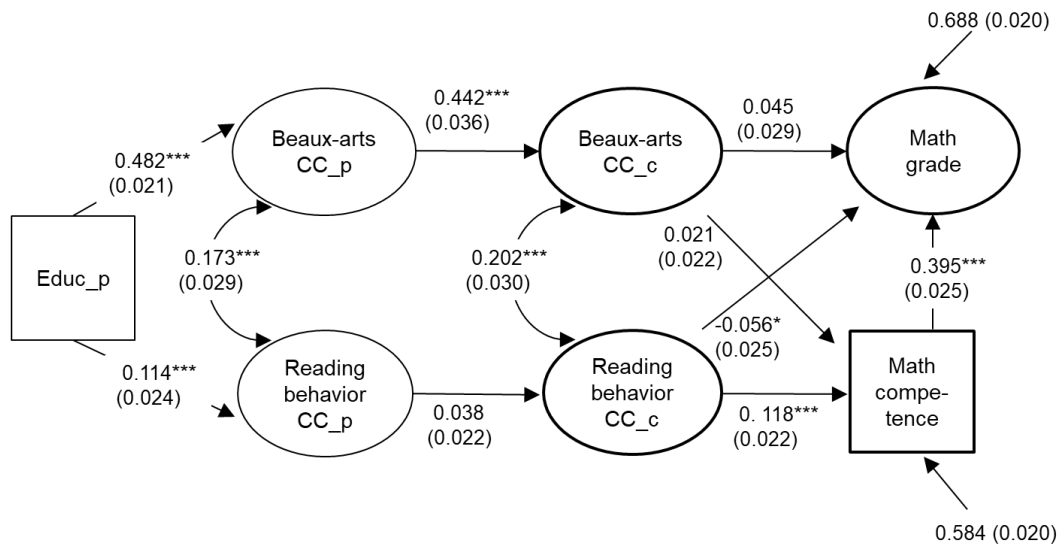
Figure S1. Path diagram and parameter estimates of the structural equation model.
Note: Standardized coefficients (STDYX) are given, with standard errors in parentheses. Some paths (e.g., path from parental education to child's academic outcomes) and additional covariates (child's gender, age, migration 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: $\chi2 = 512.137$ df(132); $p < 0.000$, CFI = 0.971, TLI = 0.960; RMSEA = .032 N = 2867. *$p < .05$, ** $p < .01$, ***$p < .001$.